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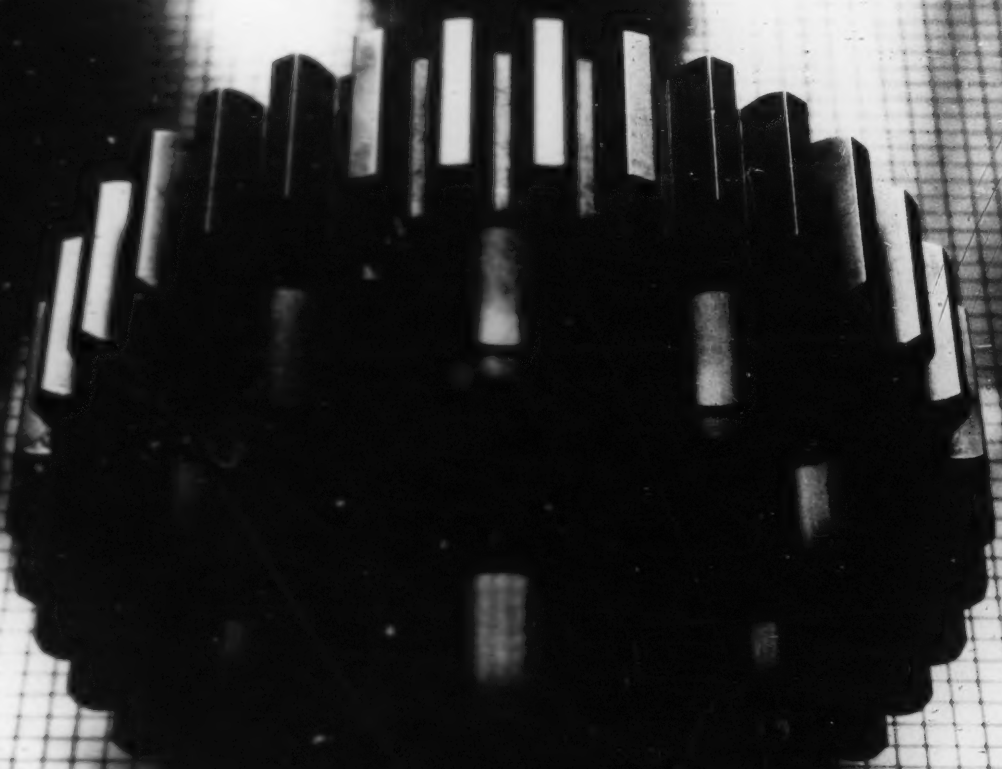
November 5, 1984

IRON AGE

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**HOW MATERIALS USE IS
CHANGING UNDER THE HOOD**

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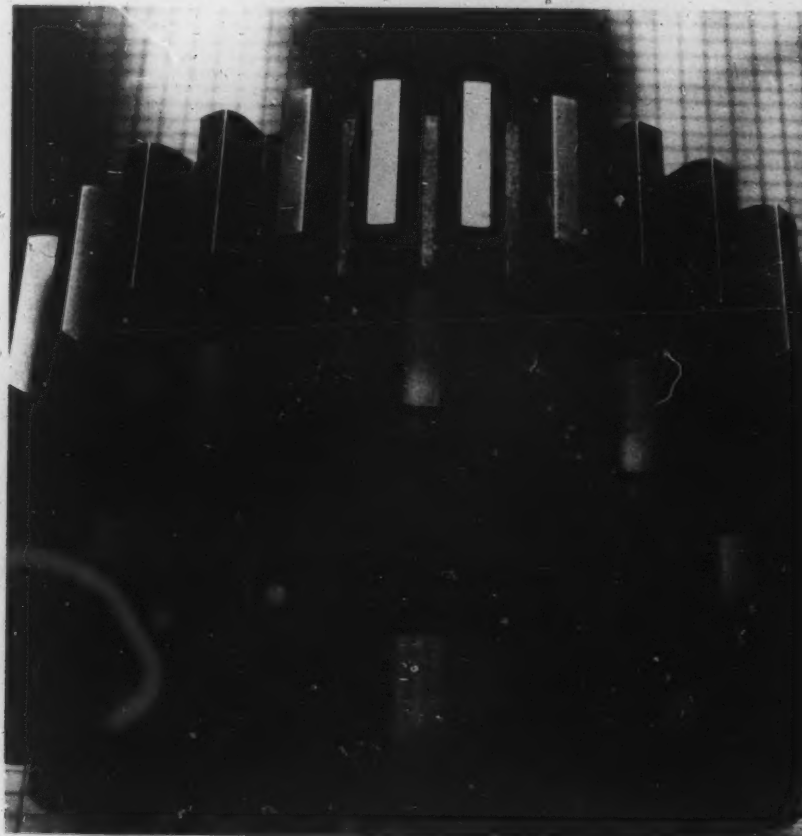


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Cover shows a near net shape part.

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Materials use is changing in many ways in the critical engine parts. Composites, ceramics and plastics are leading the charge.

The future is bright, though still uncertain, for non-metallic materials under the hood. Ceramic and plastic composite materials, already used for a number of parts today, could be the auto-makers' material of choice for more future structural components.

The great attraction of ceramics is their ability to withstand high temperatures: 2500° F so far, though ceramists hope to stretch that even higher, with fast-spinning wheels, or rotors, used to power turbochargers and gas turbine engines.

The heat generated by the explosion in the internal-combustion engine goes three ways: Some provides power, propelling the pistons; some is released as exhaust; and some is cooled by the coolant. The latter two processes are parasitic, dissipating the heat rather than using it for the transmission of car-moving power.

Turbochargers harness the energy from the exhaust gases to spin a turbine wheel, which turns an air pump (see related drawing p. 54). The pump compresses the air and forces it back into the engine. This force-fed air increases the explosion and resulting horsepower, since the gas-piston engine burns up all the air available in the combustion chamber. Diesels use about twice as much air as gasoline engines, so turbochargers work particularly well with them.

As engineers add turbochargers to engine after engine in the U.S., Japan, and Europe, some are using ceramics to build the popular powerboosters. Mitsubishi uses a ceramic turbine wheel for its turbocharger wheel; Buick plans one for the 1986 model year; and Ford is considering one. Warner-Ishi soon will produce a turbocharger in which not only the wheel but also the housing and bearing will be made of ceramic.

Garrett, the No. 1 maker of turbochargers, plans to introduce in the next two or three years the T2 turbocharger, which uses a ceramic turbine wheel. The T2 has been tested in the Nissan Pulsar NX and Pontiac Sunbird. The Sunbird's responsiveness was "significantly better than with a metal turbine metal," a Garrett spokesman said.

Like the turbocharger, the gas turbine engine uses a turbine wheel, which shoots air through a nozzle to a compressor. But the gas turbine engine's wheel is bigger and does the work of the piston in today's conventional engines: It directly drives the transmission. The power flows continuously in the gas-turbine engine, which is smoother than the intermittent-flow piston engine.

Unlike gas-piston engines, turbine engines burn up only about 20 pct of the oxygen in the combustion chamber. That significantly reduces the polluting emissions of carbon monoxide (CO) and hydrocarbons (HC). The turbine engine's spare oxygen (O) combines with the CO to form CO₂ (carbon dioxide); and with the HC to form H₂O (water) and CO₂ (carbon dioxide), said Albert H. Bell, III, the executive engineer at the GM Tech Center's advanced product engineering staff.

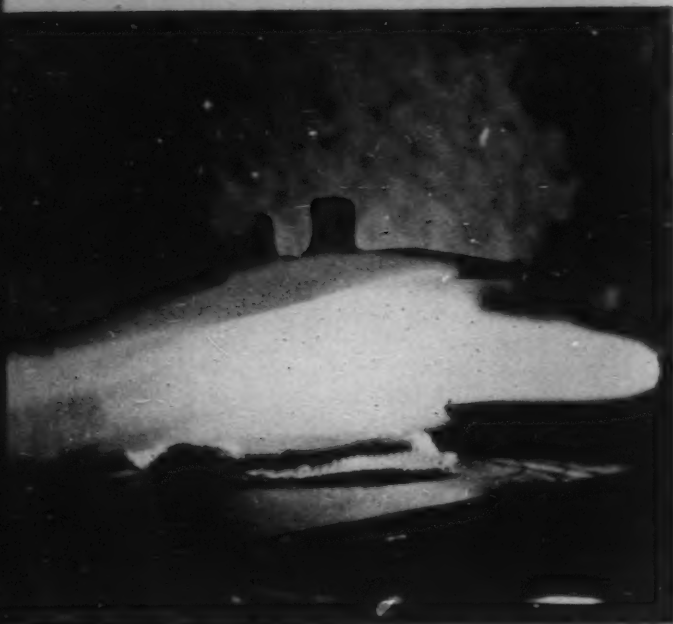
The gas turbine engine can use a variety of fuels. Its efficiency has remained the same, said William G. Agnew of GM Research, when using methanol and a number of experimental fuels derived from petroleum, coal, oil shale, and tar sands. GM even demonstrated a turbine engine fueled by powdered coal.

The turbine engine's problem, however, is its fuel economy. That can be raised by raising the engine temperatures, which requires materials that can withstand great heat: a job, in short, for ceramics.

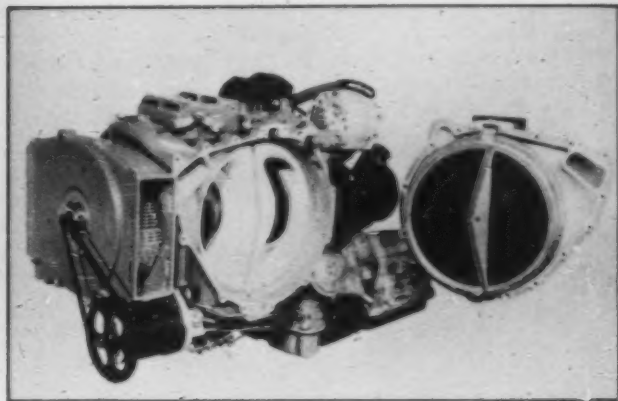
"Right now our gas turbines have a fuel economy that's equal to conventional engines," said GM's Mr. Bell. "But that's not good enough. How widely turbine engines are used depends on how high we can raise temperatures and fuel economy."

Ceramic gas turbines can reach 2500° and operate at 50-pct thermal efficiency, said John L. Mason, engineering vice president at Garrett, compared with 2000° and 35 to 40 pct for an uncooled metallic one. Thermal efficiency measures the critical ratio of power output to heat input.

At the Tokyo Auto Show last year, Nissan showed a gas-turbine engine the company plans to produce. The en-



Ceramics can withstand temperatures of up to 2600°F but are brittle. Here an experimental ceramic component of a Garrett turbine is tested in a furnace flame. Also pictured is an experimental gas-turbine engine design of GM's AGT-5.



engine's turbine wheel, burner, and some other parts were made of ceramic.

Gas Turbine Projects

Building a ceramic turbine engine that delivers good fuel economy is the goal of two advanced gas turbine (AGT) projects: The AGT100 and AGT101. Sponsored by the Dept. of Energy (DOE) and monitored by NASA, GM's Allison Gas Turbine Div. is working on the AGT100 while Ford and the Garrett Turbine Engine Co. work on the AGT101. The Allison engineers are developing a two-shaft turbine; Ford and Garrett, a one-shaft turbine.

"We still don't feel comfortable with our present ceramic rotor," Edwin E. Strain, the AGT101 program manager, told *Iron Age* last month. "By next year, however, we think we'll have a good ceramic rotor." The present ceramic rotor has gone 115,000 rpm in separate spin-tests, but one blade flew off the test engine at 97,000 rpm.

Ceramics' chief drawback is their brittleness. "Ceramics would be the most brittle of any material we've used in our engines," said William G. Hammer, a staff engineer at GM's Detroit Diesel Allison Div., which is testing ceramics for different engine parts.

Iron is more forgiving, gradually fatiguing as temperature or stress rises. Ceramics maintain the same high strength up to much higher temperatures but then suddenly break. "They fail catastrophically," say technicians to describe this sudden fracturing.

Sharp edges and corners and sharply angled twists are most prone to cracking on ceramic parts. Those are the kinds of shapes designers try to avoid.

"We've thickened the blades to reduce stresses," said Mr. Strain. "We've minimized stresses at holes and corners. Every ceramic part in the AGT101, except for one housing, is symmetrical." The AGT101 has 60 ceramic components, including 11 major structural parts.

Making Ceramic Parts

Ceramics are made by baking or firing nonmetallic, inorganic powders. They can be used as insulators or as structural components. Ceramics have been used for thousands of years for pottery and, more recently, for products such as spark plugs, toilets, and bathtubs. Their hardness makes them useful as industrial cutting tools.

Ceramics can reduce industry's need for the imported rare metals presently used for the nickel-based superalloy turbines. That's one big reason that the Japanese and the U.S. Dept. of Energy are so interested in ceramics.

Silicon carbide, silicon nitride, and zirconia are the three types of ceramics most widely being tested for use under the hood. "Those materials are still not well known," said Mr. Bell. "Their engineering characteristics have not been described well enough for us to be able to use them with confidence."

"Ceramics are where metals were fifty years ago," said Mr. Strain. "It will take a lot of work to get them ready for use in the engine."

Ceramic powders are pressed or molded to near net shape, so manufacturing them also is potentially less expensive than for metal parts. Some metal-casting operations have notoriously high scrap rates—up to 40 pct—

because of problems with porosity.

Ceramics fabrication, however, is slow. And any additional machining that's required must be done in very slow passes with diamond tooling.

The AGT101 team has reduced the manufacturing time for structural ceramics from six to three weeks. "To mass-produce structural ceramics," said Mr. Strain, "the automakers would need a lot of furnaces, which would require large capital investments."

Making ceramics is like making powdered metals, though the sintering temperatures required for ceramics are higher. Silicon nitrides (Si₃N₄) can be formed either by sintering or by reaction bonding.

The sintering process is faster but requires 1 to 10 pct of additives. Unfortunately, these additives cause a part to creep at temperatures above 1800° F. Also, shrinkage of 12 to 17 pct during sintering makes it hard to maintain tolerances, said William D. (Dave) Carruthers, a materials engineering specialist in the AGT101 project.

Reaction-bonded silicon nitride (RBSN) uses few or no additives and so undergoes no shrinkage. But the silicon metal particles must be exposed to nitride for a nitriding cycle of 12 to 21 days. In the carefully controlled reaction, silicon nitride is formed.

The reaction-bonded silicon nitride can withstand higher temperatures than the sintered equivalent (see related table p. 51), because the RBSN uses fewer additives. However, the RBSN has a porosity of 15 pct, so it's not as strong as the sintered silicon nitride, which has only 2 or 3 pct porosity.

As engineers add turbochargers to engine after engine in the U.S., Japan and Europe some are using ceramics to build the popular power boosters.



"A small void or defect will cause a ceramic part to fail," said Mr. Hammer of Detroit Diesel Allison (DDA). "That's not true with metal."

"Ceramics makers need to learn to make consistently good parts. We want to see no defects larger than .002 in."

Zirconia expands at about the same rate as steel and is smoother than silicon nitride. Both characteristics make it a good insulator or liner that can be used with steel.

Silicon nitride, however, expands about one-quarter as much as steel. That presents problems when the two materials abut.

Some of the most active work on ceramics is taking place in Japan, whose government is supporting the development. Isuzu already is using a diesel-engine ceramic precombustion chamber that was developed jointly with Kyocera.

The AGT101 team is testing at 2500° a turbine shroud made from Kyocera's silicon carbide, NGK's sintered silicon nitride, Garrett's RBSN, and Carborundum's Alpha silicon carbide.

At the same temperature, AGT101 is testing the Carborundum product for the combustor baffle and stator. Ford Research and Garrett also have made RBSN stators. The AGT101 also is testing a ceramic-matrix rotary regenerator made by Corning Glass and NGK.

Detroit Diesel Allison is looking at ceramics for a variety of parts: Piston rings, valve trains, cam rollers, and precombustion chambers could be

made of structural ceramics; pistons and piston domes of ceramic coatings. Mr. Hammer hopes that ceramics might eliminate the need for bushings for such parts as rollers.

When DDA first tested a zirconia piston ring, it cracked. The cause of such failures is twofold, said Mr. Hammer: The ceramics makers often have never made the automotive part, and automotive engineers have never designed the part for ceramics. A recipe for failure in using any new material is to design it exactly the way the old metal part was.

No Cooling System

Both Detroit Diesel Allison and Cummins are investigating ways to eliminate cooling systems in their big truck and off-highway diesel engines. Water in the cooling system can leak or boil off as steam. The oil then gets too hot, and the hoses and fan belt can break.

To eliminate the need for the cooling system, Cummins is using structural ceramics to design an adiabatic engine that would retain all its heat.

"We prefer the term 'low-heat-rejection' diesel," said Chuck Amann, head of GM Research's engine department. "'Adiabatic' implies no heat loss from the cylinder gas, and that requires a cylinder material having zero thermal conductivity. We haven't found that material, yet, not even among the ceramics."

The U.S. Army also wants to eliminate the high-maintenance cooling system and to improve fuel economy. It's given DDA \$250,000 to find out how to do that on the 6.2-liter engine used in the Army's Blazer cargo carrier.

Where will you see ceramics under the hood? They're already there in spark plugs and oxygen sensors, and you'll see more ceramic insulators and structural parts. Turbochargers already use ceramics for rotors and will use more soon for other parts as well. Manufacturers are hard at work on ceramic insulators for low-heat-rejection diesel engines.

And the gas turbine engine? "That might come a long way in the next ten years," said GM's Mr. Bell, "or it might go nowhere. People have predicted it was just over the horizon for the last forty years." Chrysler, in fact, equipped several cars with gas-turbine



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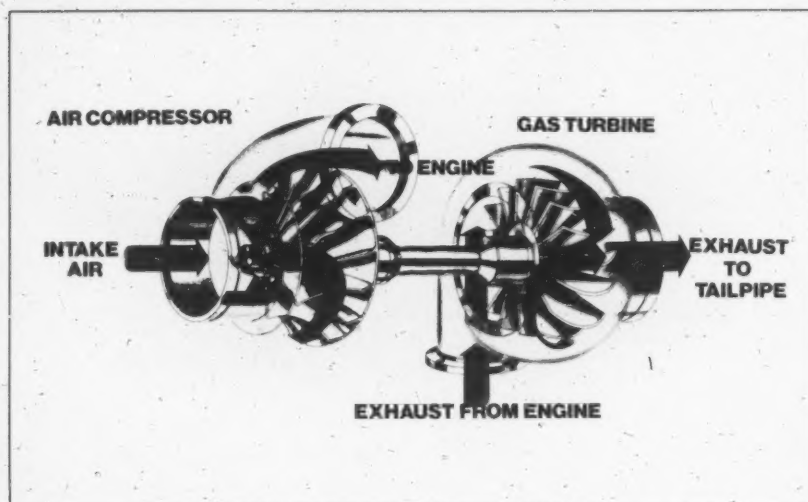


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Ceramics are being used to make the wheels of turbochargers. In this drawing exhaust from the engine (red arrow at bottom) spins the turbocharger wheel and exits at right as exhaust through the tailpipe. Intake air (blue arrow at left) is sucked in through the air cleaner and blown (top blue arrow) to give more air and power to the engine.



engines in 1964.

The consensus: Gas-turbine engines won't be widely used for at least the next fifteen years—and maybe more. But if ceramics enable the ACT101 to meet its goal of 70 miles per gallon, look out; Ceramics gas-turbine engines could be on their way. On the other hand, the ACT101 program so far is funded only until 1986. It needs to get very near its goal in the next two years.

"If ceramics ever are developed well enough to be used in mass-volume en-

gines," said GM's Mr. Bell, "then we want to be ready with the properly sized powerplant."

Plastic Composites

As chemists mix more blends that can withstand the 300° F temperatures under the hood, plastic composites are getting nearer and nearer the engine. DuPont's Minlon formula, for example, has a melting point of 495° F and is used to fabricate valve covers.

Cadillac and American Motors have used plastic-composite oil pans and

rocker-arm covers. American Motors also uses a valve cover made of Nylon 66.

Nylon 6 and Nylon 66, a heat-stabilized mineral glass, are the only two composites most widely used under the hood. DuPont, Monsanto, and Celanese supply the latter; Allied, the former.

Radiator tanks and fans, heater housings, emission-control canisters, gears for oil and water pumps, transmission rotors and many other smaller parts are made of plastic composites throughout the auto industry.

Elsewhere in the car, the Corvette's front and rear leaf springs are plastic, and GM's small M van, soon to be released, looks likely to follow suit. And the success of the Pontiac Fiero, whose outer body panels are plastic, will spawn similarly constructed cars soon.

"We're going to see more plastic body panels from GM and the other companies," confidently predicted Irvin E. Poston, manager of the composites applications group of the GM Tech Center's manufacturing engineering staff. "The great majority of our work is on improving the productivity and quality of those kinds of parts and also moldings. But the area under the hood is also worth exploring."

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How Dupont sees plastics from bumper to bumper.

The great attraction of composites is that they can consolidate into one piece several metal ones. That eliminates the fasteners and gaskets required to tie the metal pieces together. Plastics, of course, also are lighter in weight and don't rust—though they can degrade.

The nylon oil-filter housing made by DuPont (see photo), for example, incorporates an integral intake tube right into the part. The valve cover made of DuPont's Minlon has a built-in drip rail. Nylon oil pans can replace two metal stampings that must be welded together.

"It's pretty hard for plastics to beat out a regular metal stamping," pointed out Frank O. Swanson, an engineer in the plastics, sealants, and adhesives group of Ford's engine engineering office. "But once that stamping requires other operations, like welding or fastening on baffles or tubes, then plastics can be cost effective."

Composites lend themselves to more complex configurations than do metal stampings. Cadillac used a plastic torque chain cover because "it would have been difficult to make a conventional one-piece stamping in that shape," said Mr. Poston. As a bonus, the plastic part also weighed 40 pct less than the metal would have.

"Cadillac's plastic part is thicker than the metal one," said Mr. Poston. "But the composite's material density is one-quarter that of steel, so the plastic part can be two or three times as thick as the steel one and still save 40

pct of the weight.

"The modulus of composites is around 2 million, compared with steel's 30 million. So plastics must be thicker in order to pick up the required stiffness."

Plastic molding, on the other hand, "can always beat out metal castings in cost," said Ford's Mr. Swanson. "The material cost of plastic might be twice that of aluminum, for example, but an aluminum casting has to be thicker.

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(Thousands of Pounds)

	1982	1983	1984	1985	1986	1987	1988
Body Panels	66407	100337	141763	150315	171348	174330	170592
Electrical	117	170	200	193	217	222	217
Passenger Compartment	3140	3784	5293	5898	6819	6817	8352
Suspension, Chassis, & Frame	420	1324	2059	2581	3584	3600	4361
Underhood	21212	26551	27897	23093	23141	23366	22711
Total Car	91296	132166	177212	182080	205109	208335	206233

In Trucks

	1982	1983	1984	1985	1986	1987	1988
Cab Interiors	21648	23754	25786	23047	22182	22060	22568
Cab Shell & Exteriors	20647	26311	30958	37697	37328	39454	40125
Engine Drive Exterior Accessories	1046	1152	1315	1355	1315	1378	1355
Suspension, Chassis, & Frame	3531	3786	3866	4043	3898	3898	3911
Tilt Front Ends	894	1012	1622	2948	5266	11376	11515
Underhood	7691	10845	13080	14378	14270	14270	14478
Total Truck	62631	74425	34316	90934	91505	99682	101258

Source: Owens-Corning Fiberglas Corp., Nov. 1983

Plus, plastic moldings don't have the problem with porosity that metal castings do."

For the past three years, Ford has been using the lost-wax method of molding plastic parts that have interior cavities: manifolds and water pumps, for example. An alternative is to weld two or more thermoplastic parts by ultrasonics, vibration, or heat. Thermosets can't be ultrasonically welded, said Mr. Swanson, so lost-wax molding is particularly useful for them.

Thermoplastics range from polyethylene and polypropylene, which cost less than 50¢ per lb to polyamides like Nylon (\$1.50 per lb), polyamides (over \$2 per lb), and Polyimides (\$6-8 per lb). The greater the thermoplastic's ability to withstand heat, the more expensive it is.

Thermosets include polyesters (under \$1 per lb) and epoxies (over \$1 per lb).

Manufacturing cycling times range from one to two minutes for thermoplastics and from two to four minutes for thermosets. Cycle times are gradually decreasing, said Mr. Poston, who fore-

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- Select K-70 lawnmowers
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- Continue to type in this activity until all work orders have been reviewed
- Type END when you have finished reviewing work orders
- Select Sales from menu
- Select K-70 lawnmowers
- Select choice of screen display reports from menu
- Determine number of units sold by Friday
- Type END when you have finished reviewing work orders
- Select Inventory from menu
- Select K-70 lawnmowers
- Select choice of screen display reports from menu



sees 45 seconds for thermoplastics and one minute for thermosets in the next ten years or so. That will improve composites' competitive position against metals.

Industry technicians presently are working on transfer molding, which combines elements of compression and injection molding. "A larger slug of material is transferred from a cylinder through a relatively larger opening into the mold cavity," said Mr. Poston. In conventional injection molding, the material is forced through a small gate.

The normal operating temperature in most parts under the hood is around 250°F, though the hottest parts can climb above 300°F. Polyethylene and polypropylene can't stand 200°F. Some of the high-performance plastics can go through 350°F paint ovens, and some new, expensive (\$3-6 per lb) plastics like PPS and PEEK can withstand 450°F. Plastics are organic, and organic materials can't live at temperatures above 800°F.

Plastics expand two or three times more than metals do—a characteristic that must be considered in designing

plastic parts.

Unfortunately, pointed out Mr. Swanson, "design engineers rarely design parts that take plastics' characteristics into account. Nine times out of ten, the first generation of plastic parts look just like the metal parts and are put on the vehicles the same way the metal parts are—even using screws when plastic can be attached more efficiently. The engineers haven't really convinced themselves that plastic will do the job."

Besides lacking experience with many of the new plastics, engineers must figure out all the different plastic-classification codes used by the different car companies. The American Society for Testing and Materials (ASTM) has developed a common code for plastics that Mr. Swanson hopes will be used throughout industry and government in the next five years.

Plastics can catch fire, and engineers need to design against that. They're still frightened by the memory of the 1970 Pinto whose plastic air cleaner caught on fire: Backfiring ignited gasoline in the cleaner tray.

"Under 99.9 pct of operating conditions, plastics have no problem with fire," said Mr. Poston. "The problem is that 0.1 pct where excessive heat can create conditions for a fire. We just need to design against that."

Rubber and graphite are two other materials winning new parts under the hood. Starting with some 1985 models, Ford plans to introduce all-rubber gaskets for the oil pans and rocker-arm covers, eventually on all models.

Ford's timing belts are silicone rubber reinforced with two plies of DuPont's Nomax composite. Rubber can withstand 500°F, said Edward J. Duda, an engineer in the materials, fasteners, and value engineering section of Ford's engine engineering group.

Graphite is used to make the gasket with which Ford mounts its exhaust-gas recirculation (EGR) system directly on the engine.

In a major effort to eliminate engine leaks, Ford has authorized its engineers to spend \$10 more per engine on better gaskets and seals. That should mean another wave of nonmetallic parts under the hood. □

LAWNMOWERS BY FRIDAY?

SIMPLE ANSWER

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PRICE & PRODUCTION DATA

(Effective October 22, 1984)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	123	129	124	183
Pittsburgh	198	191	230	229
Youngstown	95	98	99	113
Lake Erie	137	140	159	142
Detroit	139	133	116	134
Chicago	351	360	350	493
Cincinnati	86	84	81	105
St. Louis	75	78	74	79
Southern	166	156	159	147
Western	77	69	70	99
U.S. Production	1,447	1,438	1,462	1,733

Source: American Iron & Steel Institute

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Pellets (per iron unit natural).....	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81.

86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82. Hanna Mining as of 2/26/82.

**Effective 8/1/83.

NONFERROUS PRICES

(Effective October 22, 1984) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	45.52	44.57	10/22/84
Copper (C)	61.00-62.00	60.00-62.00	10/19/84
Lead	22.00-26.00	23.00-26.00	10/3/84
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	216.61	213.88	10/22/84
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	45.00	45.00-48.00	9/21/84

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. CANADA: ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$140.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.55
Calcium, ton lots, crown	\$3.58
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$338.40
Indium, dollars per troy oz.	\$3.30
Iridium, dollars per troy oz.	\$450
Magnesium sticks, 10,000 lbs.	\$1.97
Mercury, per 76-lb. f.o.b. N.Y.	\$327-\$335
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective October 22, 1984)

	Last Week	Two Weeks Ago	To Date 1984	To Date 1983
Net tons, in thousands	1,447	1,438	76,162	65,763
Capability Utilization Rate	55.9	55.5	70.1	54.2

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (\$/lb.—ef. 7/1/84)	27.582	27.582	27.582	26.822
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$ 83.17	\$ 83.50	\$ 85.17	\$ 77.83
No. 2 bundles	\$ 50.83	\$ 51.17	\$ 51.50	\$ 46.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh ..	\$ 88.50	\$ 88.50	\$ 95.50	\$ 82.50
No. 1 steel, Philadelphia ..	79.50	80.50	81.50	71.50
No. 1 steel, Chicago	81.50	81.50	81.50	79.50
No. 1 bundles, Detroit	75.50	75.50	77.50	81.50
Low Phos., Youngstown ..	78.50	78.50	80.50	84.50
No. 1 mach'y cast., Pgh...	69.50	69.50	71.50	74.50
No. 1 mach'y cast., Phila ..	98.50	98.50	98.50	95.50
No. 1 mach'y cast., Chi..	113.50	113.50	115.50	109.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$140
Platinum, per troy oz.	\$330
Rhodium, per troy oz.	\$800
Silver ingots, per troy oz.	\$7.255
Vanadium	\$6.00
Zirconium sponge	\$12.00-\$17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Oct. 15—549.79	Oct. 18—548.86
Oct. 16—547.54	Oct. 19—549.79
Oct. 17—549.79	

**Scrap Prices
Brass Mill Scrap**

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turning
Copper	55½	54½
Yellow brass	52¼	51¼
Red brass	53	52¼
Comm. bronze	53½	52½
Mang. bronze	55¼	47½
Free cutting rod ends	52	51

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	52
No. 2 copper wire	43
Light copper	34

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	48
No. 2 copper wire	39
Light copper	30
No. 1 composition	45
No. 1 comp. turnings	42
Hvy. yellow brass solids	34
Hvy. yellow brass turnings	31
Radiators	37

Aluminum	
New mixed clips	32 —33
Old sheet	30 —31
Old cast	30 —31
Clean dry borings	31 —32

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum	
Segregated clippings	28 —29
Mixed L.C. clips	24 —26
Old sheets and cast	22 —23
Borings and turnings	18 —20
Duraluminum clippings	24 —25

Copper and Brass

No. 1 copper wire	42 —43
No. 2 copper wire	34 —35
Light copper	29 —30
Radiators	31 —32
No. 1 composition	40 —41
No. 1 composition turn'gs	37 —38
Cocks and faucets	27 —28
Clean heavy yellow brass	28 —29
Brass Pipe	29 —30
New soft brass clippings	41 —42

Lead

Heavy soft lead	9 —10
Whole batteries	3 —4
Type metal	15 —16
Electrotype	13 —14

Nickel

Nickel solids	115 —120
Nickel rod ends	115 —120
Nickel sheets, clips	115 —120
Nickel turnings	40 —45

Zinc

New zinc clippings	18 —19
Old diecast zinc	14 —15

EFFECTIVE OCT. 22, 1984

(Effective October 22, 1984) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 88.00 to \$ 89.00
No. 2 hvy. melting	78.00 to 79.00
No. 1 dealer bundles	103.00 to 104.00
No. 1 factory bundles (auto)	99.00 to 100.00
No. 2 bundles	52.00 to 53.00
No. 1 busheling	99.00 to 100.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	51.00 to 52.00
Cast iron borings	49.00 to 50.00
Low phos. punchings plate	107.00 to 108.00
Heavy turnings	78.00 to 79.00
No. 1 RR hvy. melting	96.00 to 99.00
Rails 2 ft. and under	112.00 to 113.00
Scrap rails, random lgth.	103.00 to 104.00
RR specialties	105.00 to 106.00
No. 1 machinery cast	69.00 to 70.00
Cupola cast	62.00 to 63.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	560.00 to 570.00
18-8 turnings	460.00 to 470.00

Chicago

No. 1 hvy. melting	\$ 81.00 to \$ 82.00
No. 2 hvy. melting	74.00 to 75.00
No. 1 dealer bundles	97.00 to 98.00
No. 1 factory bundles (auto)	93.00 to 94.00
No. 2 dealer bundles	51.00 to 52.00
No. 1 busheling	97.00 to 98.00
Shredder scrap	96.00 to 97.00
Machine shop turn.	44.00 to 45.00
Mixed bor. and turn.	46.00 to 47.00
Shoveling turnings	52.00 to 53.00
Cast iron borings	49.00 to 50.00
Low phos. forge crop	117.00 to 118.00
Low phos. punchings plate	
1/4 in. and heavier	127.00 to 128.00
Low phos. 2 ft. and under	122.00 to 123.00
No. 1 RR hvy. melting	97.00 to 98.00
Scrap rails, random lgth.	99.00 to 100.00
RR couplers and knuckles	110.00 to 111.00
RR car axles	121.00 to 122.00
No. 1 machinery cast	101.00 to 102.00
Cupola cast	133.00 to 134.00
Stove plate	113.00 to 114.00
Steel car wheels	102.00 to 103.00
Stainless	97.00 to 98.00
18-8 bundles and solids	111.00 to 112.00
18-8 turnings	
430 bundles and solids	490.00 to 500.00
430 turnings	420.00 to 430.00
	120.00 to 125.00
	80.00 to 90.00

Philadelphia

No. 1 hvy. melting	\$ 78.00 to \$ 81.00
No. 2 hvy. melting	71.00 to 74.00
No. 1 dealer bundles	93.00 to 96.00
No. 2 dealer bundles	47.00 to 50.00
No. 1 busheling	93.00 to 96.00
Shredder scrap	100.00 to 103.00
Machine shop turn.	29.00 to 32.00
Mixed bor. and turn.	29.00 to 32.00
Shoveling turnings	38.00 to 41.00
Low phos. 5 ft. and under	89.00 to 92.00
Low phos. 2 ft. punchings	114.00 to 117.00
Electric furnace bundles	98.00 to 101.00
RR specialties	96.00 to 99.00
Rails, 2 ft. and under	116.00 to 119.00
Cupola cast	78.00 to 81.00
Heavy breakable cast	57.00 to 60.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Broker buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 57.00 to \$ 58.00
No. 2 hvy. melting	56.00 to 57.00
No. 1 dealer bundles	75.00 to 76.00
No. 2 bundles	39.00 to 40.00
No. 1 busheling	74.00 to 75.00
Drop forge flashings	45.00 to 46.00
Machine shop turn.	49.00 to 50.00
Mixed borings and turn.	26.00 to 27.00
Shoveling turnings	50.00 to 51.00
Cast iron borings	34.00 to 35.00
Heavy breakable cast	40.00 to 41.00
Mixed cupola cast	56.00 to 57.00
Automobile cast	80.00 to 81.00
Stainless	
18-8 bundles and solids	455.00 to 465.00
18-8 turnings	380.00 to 370.00
430 bundles and solids	110.00 to 120.00

Youngstown

No. 1 hvy. melting	\$ 64.00 to \$ 67.00
No. 2 hvy. melting	47.00 to 50.00
No. 1 dealer bundles	77.00 to 80.00
No. 2 dealer bundles	35.00 to 38.00
Machine shop turn.	13.00 to 16.00
Shoveling turnings	18.00 to 21.00
Low phos. plate	77.00 to 80.00
Electric furnace bundles	74.00 to 77.00
Galvanized bundles	65.00 to 68.00

Cleveland

No. 1 hvy. melting	\$ 58.00 to \$ 61.00
No. 2 hvy. melting	37.00 to 40.00
No. 1 dealer bundles	71.00 to 74.00
No. 2 bundles	77.00 to 80.00
No. 1 busheling	19.00 to 22.00
Machine shop turn.	76.00 to 79.00
Mixed bor. and turn.	8.00 to 11.00
Shoveling turnings	8.00 to 11.00
Cast iron borings	10.00 to 13.00
Cut structural & plates,	13.00 to 16.00
2 ft. and under	
Low phos. punchings plate	110.00 to 113.00
Drop forge flashings	110.00 to 113.00
Foundry steel, 2 ft. & under	42.00 to 45.00
No. 1 RR hvy. melting	62.00 to 65.00
Rails, 2 ft. and under	79.00 to 82.00
Rails, 18 in. and under	115.00 to 118.00
Steel axle turnings	115.00 to 118.00
Railroad cast	59.00 to 62.00
No. 1 machinery cast	92.00 to 95.00
Cupola cast	102.00 to 105.00
Stove plate	58.00 to 61.00
Stainless	44.00 to 47.00
18-8 bundles	375.00 to 385.00
18-8 turnings	325.00 to 335.00
430 bundles	80.00 to 85.00

Buffalo

Broker buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 67.00 to \$ 68.00
No. 2 hvy. melting	56.00 to 57.00
No. 1 busheling	90.00 to 91.00
No. 1 dealer bundles	79.00 to 80.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	14.00 to 15.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	22.00 to 23.00
Low phos. plate	95.00 to 96.00
Structural and plate,	
2 ft. and under	98.00 to 99.00
Rails, 2 ft. and under	98.00 to 99.00
Scrap rails, random lgth.	77.00 to 78.00
No. 1 machinery cast	81.00 to 82.00
No. 1 cupola cast	61.00 to 62.00

St. Louis

No. 1 hvy. melting	\$ 67.00 to \$ 68.00
No. 2 hvy. melting	56.00 to 57.00
Foundry steel, 2 ft.	67.00 to 70.00
No. 1 dealer bundles	67.00 to 68.00
No. 2 bundles	51.00 to 52.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	27.00 to 28.00
No. 1 RR hvy. melting	67.00 to 68.00
Rails, random length	72.00 to 73.00
Rails, 18 in. and under	90.00 to 91.00
RR specialties	87.00 to 88.00
Cupola cast	72.00 to 73.00
Heavy breakable cast	50.00 to 51.00
Stove plate	83.00 to 84.00
Steel car wheels	101.00 to 102.00
Rolling rails	80.00 to 81.00
Unstripped motor blocks	61.00 to 62.00

Birmingham

No. 1 heavy melting	\$ 73.00 to \$ 74.00
No. 2 heavy melting	67.00 to 68.00
No. 1 dealer bundles	75.00 to 76.00
No. 2 bundles	55.00 to 56.00
No. 1 busheling	75.00 to 76.00
Shredder scrap	97.00 to 98.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Electric furnace bundles	69.00 to 70.00
Elec. furnace, 3 ft. & under	73.00 to 74.00
Structural and plate, 2 ft.	103.00 to 104.00
Structural and plate, 4 ft.	93.00 to 94.00
No. 1 RR hvy. melting	93.00 to 94.00
Scrap rails, random lgth.	96.00 to 97.00
Rails, 2 ft. and under	108.00 to 110.00
Angles and splice bars	92.00 to 93.00
No. 1 cupola cast	87.00 to 88.00
Unstripped motor blocks	89.00 to 90.00

Cincinnati

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 57.00 to \$ 58.00
No. 2 hvy. melting	54.00 to 55.00
No. 1 dealer bundles	69.00 to 70.00
No. 2 bundles	30.00 to 31.00
Machine shop turn.	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Cast iron borings	19.00 to 20.00
Low phos. 18 in. and under	88.00 to 89.00
Rails, random length	71.00 to 72.00
Rails, 2 ft. and under	84.00 to 85.00
No. 1 cupola cast	60.00 to 61.00
Heavy breakable cast	28.00 to 29.00
Drop broken cast	78.00 to 79.00

New York

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 48.00 to \$ 50.00
No. 2 hvy. melting	39.00 to 41.00
No. 2 dealer bundles	23.00 to 27.00
Mixed bor. and turn.	11.00 to 13.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	14.00 to 15.00
Clean cast, chem. borings	35.00 to 36.00
No. 1 machinery cast	89.00 to 90.00
Mixed yard cast	50.00 to 51.00
Heavy breakable cast	10.00 to 12.00
Stainless	
18-8 prepared solids	490.00 to 510.00
18-8 turnings	390.00 to 410.00
430 prepared solids	90.00 to 110.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 68.00 to \$ 70.00
No. 2 hvy. melting	58.00 to 60.00
No. 1 dealer bundles	68.00 to 70.00
No. 2 bundles	41.00 to 43.00
No. 1 busheling	75.00 to 77.00
Shredder scrap	74.00 to 76.00
Machine shop turn.	14.00 to 16.00
Shoveling turnings	22.00 to 24.00
No. 1 machinery cast	85.00 to 90.00
Mixed cupola cast	54.00 to 56.00
Heavy breakable cast	10.00 to 12.00

San Francisco

No. 1 hvy. melting	\$ 47.00 to \$ 49.00
No. 2 hvy. melting	41.00 to 43.00
No. 1 dealer bundles	37.00 to 39.00
No. 2 dealer bundles	19.00 to 21.00
Machine shop turn.	6.00 to 8.00
Cast iron borings	6.00 to 8.00
No. 1 cupola cast	81.00 to 83.00

Los Angeles

No. 1 hvy. melting	\$ 48.00 to \$ 50.00
No. 2 hvy. melting	41.00 to 43.00
No. 1 dealer bundles	38.00 to 40.00
No. 2 dealer bundles	19.00 to 21.00
Machine shop turn.	10.00 to 12.00
Shoveling turnings	8.00 to 10.00
Cast iron borings	6.00 to 8.00
Elec. furnace, 1 ft. and under	
(foundry)	77.00 to 79.00
No. 1 cupola cast	75.00 to 77.00

Seattle

No. 1 hvy. melting	\$ 70.00 to \$ 72.00
No. 2 hvy. melting	59.00 to 61.00
No. 2 bundles	41.00 to 43.00
No. 1 cupola cast	94.00 to 95.00
Mixed yard cast	84.00 to 86.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:	
No. 1 heavy melting	\$ 91.00
No. 2 heavy melting cut 2 ft. and under	87.00
No. 1 dealer bundles	92.00
No. 2 bundles	53.00
Mixed steel scrap	82.00
Bush. new fact. prep'd	83.00
Bush. new fact. unprep'd	83.00
Machine shop turn.	41.00
Short steel turn.	43.00
Mixed bor. and turn.	30.00
Cast scrap	79.00

Houston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 73.00 to \$ 74.00
No. 2 hvy. melting	60.00 to 61.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	16.00 to 17.00
Crushed turnings	34.00 to 35.00
Shredder scrap	78.00 to 79.00
Cut structural plate, 2 ft. and under	102.00 to 104.00
Cut structural plate, 5 ft. and under	96.00 to 98.00
Unstripped motor blocks	80.00 to 81.00
Cupola cast	80.00 to 81.00

PRODUCER KEY With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilber B. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.

M9 Mottrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelson Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P9 Pacific States Steel Co., Niles, Cal.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Robin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.

S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

Cities*	Sheets			Strip	Plates	Shapes	Bars			Alloy Bars			
City Delivery Charge*	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed	
Atlanta	29.65	33.55	34.48	31.63	27.02	23.28	19.55	31.25	34.34	50.80	69.58	73.19	
Baltimore	26.90	30.72	37.59	39.82	34.75	28.80	22.80	38.65	57.45	64.70	71.71	75.11	
Birmingham	26.60	32.82	34.59	31.64	26.64	23.01	19.99	30.91	49.31	58.90	68.10	74.43	
Boston	34.94	40.19	45.64	47.54	35.34	30.06	23.59	40.29	47.92	51.02	58.48	63.50	
Buffalo	31.10	35.68	41.89	40.15	32.59	27.12	19.86	37.75	44.15	47.85	53.92	59.84	
Chicago	29.26	34.62	37.84	32.74	25.10	22.00	17.70	31.53	38.02	41.09	46.52	52.75	
Cincinnati	28.91	34.58	37.16	30.85	24.84	20.75	17.96	32.96	37.16	42.54	46.63	52.44	
Cleveland	26.48	34.22	37.48	36.74	26.92	26.13	18.81	38.35	42.14	45.56	49.98	55.88	
Denver	33.62	38.88	40.88	36.36	34.45	28.66	21.82	44.31	52.10	60.06	67.38	75.21	
Detroit	29.21	36.65	37.87	31.39	26.63	23.86	16.36	32.71	37.18	42.51	46.81	53.48	
Houston	27.67	30.98	37.71	39.21	26.73	27.73	24.22	40.15	48.97	55.05	61.50	68.09	
Kansas City	31.68	36.69	40.00	36.84	28.03	30.65	20.13	33.82	42.07	47.84	53.21	60.30	
Los Angeles	27.01	31.33	37.84	35.32	29.83	33.12	26.52	41.33	53.89	63.84	68.43	72.14	
Memphis	26.37	32.51	35.34	33.57	27.75	26.63	21.40	33.87	36.78	49.96	58.80	69.44	
Milwaukee	29.35	34.89	37.85	33.06	26.02	24.18	17.58	30.89	36.58	41.85	45.86	52.80	
New York	32.47	38.99	42.55	43.38	33.96	27.21	21.06	40.88	45.78	49.07	61.12	65.86	
Philadelphia	30.41	36.99	41.23	43.50	31.05	28.11	20.85	38.24	46.18	50.25	61.22	65.42	
Pittsburgh	35.27	40.97	45.23	43.45	37.60	30.44	21.29	29.80	41.40	47.56	53.03	60.02	
Portland	28.96	32.08	36.73	36.93	32.88	34.78	27.57	44.85	49.78	57.74	70.44	....	
San Francisco	26.94	31.55	38.80	35.58	28.61	31.19	25.78	36.72	52.11	60.38	67.30	73.42	
Seattle	23.61	30.12	36.65	32.85	22.02	27.32	25.91	39.14	53.03	61.70	68.75	74.83	
Spokane	21.21	30.42	35.85	38.02	35.00	33.77	21.97	43.01	43.30	47.52	....	58.32	
St. Louis	29.11	34.80	37.31	34.59	26.19	22.90	18.40	33.87	38.12	43.51	48.85	53.86	
St. Paul	26.87	33.61	36.89	38.36	26.91	23.73	17.70	33.98	37.52	42.72	47.09	53.31	

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip— $\frac{1}{2}$ " x 1"; Plate $\frac{1}{2}$ " x 84'; Shapes—1 Beams 6 x 12.5; Hot-rolled bar—Rounds $\frac{3}{4}$ —2 $\frac{1}{2}$ "; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1 $\frac{1}{2}$ " round; Cold drawn—1" round; Hot-rolled 4140—1 $\frac{1}{2}$ " round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

Codes identify Producers listed in the Key on page 67. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rolling, Midwest	
W5	\$366.00
N4	\$366.00
West	
C6	\$346.00
Carbon Forging, East	
B3(2), C10, U1	\$473.00
R3	\$453.00
Midwest	
R3, W5	\$453.00
S1, U1, I3	\$473.00
C10	\$473.00
K2	\$453.00
West	
B3(2)	\$463.00
C6	\$453.00
Alloy, East	
R3	\$492.00
B3, U1, C10	\$512.00
Midwest	
W5	\$492.00
U1, C10, I3	\$512.00
R3	\$492.00
S1	\$512.00
West	
B3	\$502.00
C6	\$469.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	26.45

Structurals

Carbon, East	
B3	22.90
U1, J3	23.90
Midwest	
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3	22.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	23.90
I3	23.90
West	
B3	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	22.90
U1, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
C6	24.15

Strip

Hot-Rolled, Carbon, Cut II Edge—all widths, East

U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3, D1, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1, A7	23.75
U1, B3, I3	23.75
M2, R3	22.95
West	
B3	26.55
South	
R3	22.05

Cold-Rolled, Carbon Max. 25%, East

E4	29.75
S10	29.60
P15	24.80
B4	36.60
G6	36.175
Midwest	
I4	36.30
W14	32.80
J4	34.05
S1	37.05

High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)*

Midwest	
M2, R3, W3, J3, I3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05

High-Strength, Cold-Rolled, Low Alloy, Mill Edge

Midwest	
S1	37.05
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	26.10
I4	25.20
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
B4	47.25
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr).

East	
B3	23.75
J3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5, S1, B3, I3, A7	23.75
West	
L1	24.25
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2)	26.15
J3	26.15
U1	26.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.85
I4	22.00
J3	26.15
D1	26.15
U1, W5, S1, B3, I3, A7	26.15
West	
U1	26.65
South	
R3	24.65

Galvanized (hot-dipped), East

B3(2)	30.30
U1	30.30
Midwest	
J3, D1, W3	26.00
R3, Y1	26.00
G2, M11	30.00
U1, W5, S1, I3, A7	30.30
West	
U1	30.80
South	
R3	28.00

Enameling, Midwest

U1, S1, I3, A7	29.65
J3	27.65
Long-Term, Midwest	
W5, A7	31.65
U1	31.65
R3	29.35

Wire Rod

East	
B3(2)	22.36
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00

West

C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate

Single Reduced (70 lb)

per case box

East

J3

U1

B3

Midwest

U1

J3

M11

W3

W5

West

U1

South

U1

Double Reduced (55 lb)**

Midwest

M11

J3

U1

W3

W5

West

U1

South

U1

Black Plate

Single Reduced (75 lb)*

East

B3

Midwest

J3, W5

I3, W5

W3

U1, M11

West

U1

Double Reduced (55 lb)

East

B3

Midwest

M11

W5

J3

W3

W5

U1

West

U1

South

U1

*70 lb—base weight extra 45¢

**50 lb—base weight extra \$1.40

Bars

Carbon Steel, Hot-Rolled

(Special quality)

East	
R3, K3	25.80
R5	25.80
J3	25.80
U1, C10, B3(3)	27.05
Midwest	
I4	23.95
U1, I3	27.05
R8, T10, C20, N4	25.80
K2	25.80
I3	22.00*
A7	20.25
West	
B3	25.80
C6	24.45
South	
A8	20.65
C16	25.80

Cold-Finished Carbon, East

A11	22.15
R3	33.75
C21	21.15
J3(4), L2	31.00
M8, W10, T11, S8	31.00
N1	24.475
R4	33.25
B4	33.25
C10	31.00
Midwest	
W10, R3, M8	33.25
J3	31.00
B1	33.45
L2	36.75
N9	31.00
W14	22.00
B6	34.75

West

R3	37.15
South	
J3	34.00
C16	24.45
J3	21.95

Alloy, Hot-Rolled, East

R6, K3	27.95
R3, J3	27.95
U1, B3(2), C10	29.29

Midwest

R3	27.95
I3, C10, U1	29.29
I4	26.10
I3	23.50*
A7	30.25

West

B3	27.95
C6	26.60
South	
A8	32.00

Alloy, Cold Drawn, East

L2	36.20
R3, N1	37.90
R4	37.10
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85

Midwest

R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
L2	34.85
B5	38.60
M9	37.10

West

R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East

B3	23.25
L4, U1	25.75
P2	25.75
J3	26.75

Midwest

B3	23.25
I3	25.75
J3, A7	22.80
U1, I4, S1	25.75
R3	26.75

West

C6	24.25
U1, B3	25.75
O2	23.00
South	
R3	25.75
U1	25.75

Alloy, East

B3	31.05
U1, L4	33.55
P2	33.55
J3	34.55

Midwest

B3	31.05
G2, G3	33.55
I4, U1	33.55

West

B3	33.55
O2	31.00
South	
U1	33.55

Wire

Carbon Steel Wire, East

B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20

South

A8	26.85
West	
C6	24.95

CHILTON'S

C2150-8-

November 19, 1984

IRON AGE

MANUFACTURING MANAGEMENT



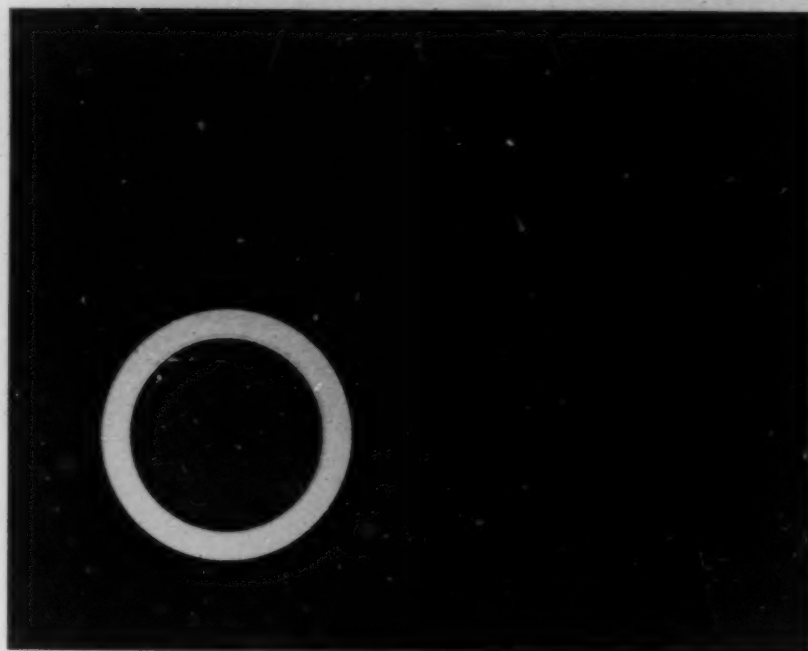
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**WHAT'S NEXT FOR THOSE
HIGH FLYING
COMPOSITE MATERIALS**

**EXPLOSION
DURING**

**NEW MERGER GUIDELINES—
WHAT YOU SHOULD KNOW
BEFORE YOU BUY**

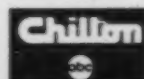
CHILTON'S
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ONE OF THE ABC PUBLISHING COMPANIES

MEGA-DEALS NOW RULE MERGERS

Billion-dollar-plus merger deals have spread from the oil industry to others. And 'going-private' deals are increasing in numbers.



Corporate merger/acquisition activity cooled in the second quarter.

The number of transactions announced in the quarter totaled 627, down from 710 in the opening period of the year. And the dollar value involved in the transactions totaled \$32.3 billion, down from \$48.3 billion in the first quarter.

However, for the first half this year, the number of transactions and dollar value were both well above the first half totals of last year. (See table). The data comes from the Chicago merger consultant firm, W. T. Grimm & Co.

The first-half total in dollar value of \$80.6 billion broke the record for any six-month period since the firm launched its merger data program in 1963.

Grimm Chairman Willard T. Grimm said, "The mega-deals in the oil and gas industry early this year spread into other industries."

He pointed out that there were 12 transactions valued at \$1 billion or more during the first six months this year. These mega-deals totaled \$48.7 billion, 60 pct of the total.

Moreover, there were 104 transactions with price tags of \$100 million or more. This number was up 73 pct from the 60 recorded in last year's first half.

Tomislava Simic, Grimm's director of research, attributed a 37 pct first half increase in acquisitions of publicly-traded companies to undervalued per-share prices of many of them. This makes the stock "available at a discount from its real value and thus vulnerable to takeover," she explained.

Another factor accounting for the big increase in takeovers, she said, "is the significant growth in going-private transactions—acquisitions of publicly-traded companies by private investment groups or individuals."

There were 40 going-private transactions in the first half this year, more than double the 16 deals reported in last year's first half. The dollar value of

the 40 deals increased about nine-fold to \$11.4 billion, up from a year-earlier \$1.3 billion.

Privately-held companies have also been going the merger route in a big way lately. Acquisitions of private companies totaled 710 in the first half. That is a 24 pct jump from the same time span last year.

Business borrowing is badly lop-sided

If U.S. industry is to escape a credit crunch this year, it may well have to quickly change its financing ways.

The problem is that U.S. nonfinancial corporations are depending far too heavily on short-term borrowing to meet their recovery needs.

In the second quarter of this year, these corporations took on bank loans to the tune of \$76.6 billion at a seasonally adjusted annual rate. That was down from an extraordinarily high \$86 billion in the first quarter.

But, by any other standard, the second quarter showing still showed a lop-sided dependence on bank borrowing. For example, bank borrowing in the 5-year period 1979-83 averaged \$36 billion per year.

Companies, fearful of getting locked into high interest rates over the years, pared their long-term bond indebtedness in the second quarter by \$10 billion to \$27.6 billion.

And in stocks, corporations took off the market more stock than they issued in the June period. The net stock figure came to minus \$105 billion. Stock goes off the market in a number of ways: Some is bought back by corporations, for treasury stock, some is gobbled up by going-private mergers.

The one factor that could hold off any corporate finance problems this year due to unbalanced balance sheets is found in inventories. The need for stock building, and financing, is easing off. This should greatly lessen short-term borrowing needs.

BY JOHN D. BAXTER



MERGERS

WHAT YOU SHOULD KNOW BEFORE YOU BUY

BY EDWIN W. BOWERS

After two years of study Justice has again changed the way it looks at mergers with the idea, it says, of helping businessmen better understand what the government considers when evaluating a proposed merger.

As the U.S. Congress adjourned in October at least one legislator vowed the next session will take up "the major issue of the fever pitch of corporate mergers." Rep. Mike Synar (D., Okla.), a member of the House Judiciary Committee, will first be seeking the dimensions of what he believes is a problem. But others are not so sure there is a problem.

To be sure, over the first five months of this year corporate acquisitions involving more than \$50 billion in assets have taken place. In less than half of 1984 that is a total larger than all of 1983. And the number of transactions during the first quarter of this year rose 31 pct compared with the same period last year. This is a pace that does not always serve the nation's economy,

corporations or stockholders, Rep. Synar said.

"I haven't seen any increase in anti-competitive mergers," Frederick Rule, deputy assistant attorney general, told *Iron Age*. "I think the new corporate merger guidelines we issued have improved the climate, to some extent, for pro-competitive mergers."

It's probable the new merger guidelines issued by the Justice Department are at the heart of the matter. After two years of study Justice has again changed the way it looks at mergers with the idea, it says, of helping businessmen better understand what the government considers when evaluating a proposed merger.

Yet there are some critics who still pose the question: Are the new rules too vague? For support they cite the "indeterminate" way Justice arrived at its decision to approve the Republic Steel-LTV Corp. merger. The agency first disapproved the merger but later, after discussion and a compromise divestiture plan, approved it.

"We would have reached the same conclusions in that case using the old guidelines or the new ones," said Attorney General William French Smith. "The difference, we believe, is under these latest guidelines businessmen will better understand how we came to our conclusions." He said they incorporate "very largely the same" legal principles and enforcement policies embodied in the 1982 guidelines. But three features of the new philosophy are being given greater prominence. First, Justice will generally apply the same market principles to foreign competitors that it applies to domestic companies. This, for the first time, puts imports in the government's definition of a relevant market for the purpose of analyzing the effects of existing restraints. "The prior guidelines," said Mr. Smith, "did not spell out in sufficient detail how imports and foreign capacity would be weighed in analyzing individual mergers."

"The presence in the marketplace of foreign firms frequently makes it impossible for American firms to collude because any attempt to fix prices will attract increased imports," the Justice Department said. "To the extent permitted by available data, market shares generally will be assigned to foreign

LTV-Republic—What the New Merger Guidelines Created

	1983 (In Millions of Dollars)		
	LTV	Republic	Total
Sales	\$4,577	\$2,700	\$7,737
Net Earning	(\$180.7)	(\$326)	(\$625)
Operating Income Steel	(\$200)	(\$297)	(\$511)
Long Term Debt	\$1,560	\$822	\$2,270
Steel Capacity	13.3 million tons	10.9 million tons	34.2 million tons
Pct of Industry	8.9 pct	7.2 pct	16.1 pct

	Products—1983 Shipments (000) Totals			
	J&L	Republic	Tonnage	Pct of Industry
Sheet & Strip	3,486.60	2,956.06	6,442.66	22
Bars*	639.21	1,051.58	1,690.79	20
Cold Rolled Stainless Sheet & Strip	37.5%	9.9%	—	47.4

*Bar, light structurals, stainless steel & other.

firms in the same way they are assigned to domestic firms."

Alcan/Arco

Latest evidence of this new philosophy, observers say, is Justice's approval of a unique plan that allows Alcan Aluminium, Ltd. of Canada to acquire most of the aluminum producing assets of Atlantic Richfield Co. (Arco). Alcan will take over Arco's aluminum smelter in Seabree, Ky., will gain 25 pct of an alumina refinery in Ireland and acquire other U.S. aluminum rolling operations. However, the Canadian-based company will gain only 40 pct of Arco's rolling mill at Logan County, Ky., which has not yet begun full commercial operations. Arco will retain the other 60 pct of the plant with the ability to divest only with Justice Department approval. Also neither company could sell its share in the facility to any of the three leaders in the U.S. can-sheet market, Alcoa, Reynolds or Kaiser.

J. Paul McGrath, assistant attorney general for antitrust, said, "This should not be viewed as a precedent for the settlement of future cases."

Secondly, the department will take into account economic efficiency claims from a proposed merger in considering whether to approve it. Efficiency claims when "established by clear and convincing evidence," Justice said, "will be given appropriate weight" in

merger appropriate weight" in merger approval deliberations. However, the new guidelines point out that efficiencies "do not constitute a defense to an otherwise anti-competitive merger, but are one of many factors that will be considered by the department in determining whether to challenge a merger." There are various types of efficiencies that can be achieved such as plant specialization, economies of scale, better integration of production facilities and lower transportation costs. They will be given due consideration, Mr. Smith said. But, for purposes of justifying a merger, those may be very difficult to demonstrate, Justice said.

Finally, the Justice Department is seeking to retain but tone down the famous Herfindahl Index. That formula, where you square the market shares of companies in an industry and add them together to get a general competition index, will be kept, but will not be the sole basis for deciding whether a merger is anti-competitive or not. "We do not plug numbers into some magical formula and wait for a computer to decide whether to challenge a merger," said Mr. Smith. "We will not make important merger decisions on the basis of numbers alone."

"Another factor that will be considered," said Mr. Rule, "is ease of entry or, if you will, barriers to entry, the extent to which firms outside the market

can readily enter the market and, therefore, serve as a buffer against any anti-competitive abuse."

The new guidelines say: "If entry into a market is so easy that existing competitors could not succeed in raising price for any significant period of time, the department is unlikely to challenge mergers in that market. The more difficult entry into the market is, the more likely the department is to challenge the merger."

Another factor, Mr. Rule said, that could be relevant would be financial condition of one company or another, perhaps not completely failing, but very weak; whether or not that indicates something about the underlying competitive significance of one or the other of the merging parties if they tried to go it alone. In other words, it might not be failing, but you might be able to tell, based on its financial condition, that if it was independent for very much longer, it would continue to diminish as a competitive factor in the market and that would have an effect on the merger analysis we would do."

Failing Firm

The latest guidelines retain the 1982 criteria whereby under "failing firm" a merger is unlikely to be challenged. They are: If the allegedly failing firm probably would be unable to meet its financial obligations in the near future; it probably would not be able to reorganize successfully under Chapter 11; and, it has made unsuccessful good faith efforts to elicit reasonable alternative offers of acquisition of the failing firm that would both keep it in the market and pose a less severe danger to competition than does the proposed merger. Justice characterizes the failing firm defense as "ambiguous" although "long-established." Such a plea, the government said, "can immunize significantly anti-competitive mergers." Thus, the department will interpret its elements "strictly."

A new section of the 1984 guidelines requires the department to consider factors that may deflate or inflate a company's current market share compared to its future. If, for example, a company lacked the capital to upgrade its plants, the government view would be that company's market share is likely to decline. That would be taken into consideration in ruling on a merger.

(Cont. on p. 75)

The ALCAN/ARCO Plan—A New Philosophy In Mergers

Alcan Aluminum Corp.

(The Cleveland-based subsidiary of Alcan Aluminum Ltd. of Montreal)

FIVE DIVISIONS:

ALCAN INGOT & POWDERS DIV.

Products: Primary aluminum ingot (from parent smelters in Canada)

Secondary foundry ingot

Metal powders and pigments

Aluminum-based chemicals (from parent plants in Canada)

Plants: Union, N.J., Berkeley, Calif., Joliet, Ill.—powders and pastes—Joliet, Ill., and Greensboro, Ga.—secondary aluminum

ALCAN SHEET & PLATE DIV.

Products: Canstock, finstock, autobody sheet and other flat-rolled items

Plants: Oswego, N.Y.—cold rolling, hot-rolling, secondary recovery

Warren, Ohio—coated and embossed sheet for building industry, auto trim, appliance bright sheet

Fairmont, W. Va.—finstock, cookware blanks

ALCAN CABLE DIV.

Products: electrical conductor products for utility, industrial, commercial and residential markets.

Plants: Bay St. Louis, Miss.

Sedalia, Mo.

Williamsport, Pa.

ALCAN BUILDING PRODUCTS DIV.

Products: Aluminum windows, siding, roofing, ceiling systems

Plants: Bradenton, Fla., Charlotte, N.C., Gridley, Ill., Idabel, Okla., Jackson, Ga., Lancaster, Pa., Rome, Ga.; Woodbridge, N.J.

METAL GOODS DIV.

Metal service centers/distributors in 26 cities coast-to-coast

Arco Aluminum

(A unit of Arco Metals Co., a division of Atlantic Richfield Corp.)

Plants:

Sebree, Ky.—primary aluminum smelter 180,000 tons annual capacity

Columbia Falls, Mont.—primary aluminum smelter 180,000 tons annual capacity

Logan County, Ky.—rolling mill, canstock and other flat-rolled products

Terre Haute, Ind.—rolling mill, canstock and other flat-rolled products

Louisville, Ky.—rolling mill, flat rolled products and packaging products

Bridgeton, N.J.—extrusions

Olive Branch, Miss.—extrusions

Auguinish, Ireland—alumina (25 pct interest)

After the two acquisitions are finalized:

Alcan gets 40 pct interest in the Logan County plant.

Alcan gets: Sebree, Ky. smelter

Terre Haute rolling mill

Louisville, Ky. rolling mill

Arco's 25 pct interest in the Auguinish Facility.

Arco retains the Columbia Falls smelter and the extrusion units, but Atlantic Richfield is trying to sell them too.

Arco also keeps 60 pct of Logan.

Logan will be managed by an independent company represented proportionally by the two companies.

"It really depends on the people who happen to be in the department at the time and what the relationships are. We have a job and a duty and a responsibility to prevent anti-competitive

Dates	Fiscal Year	Submitted	Further	Approved
Oct. '78-Oct. '79	'79	868	102	766
Oct. '79-Oct. '80	'80	824	56	768
Oct. '80-Oct. '81	'81	1,006	66	940
Oct. '81-Oct. '82	'82	1,204	56	1,148
Oct. '82-Oct. '83	'83	1,101	62	1,039
Oct. '83-Present	'84	630	40	590

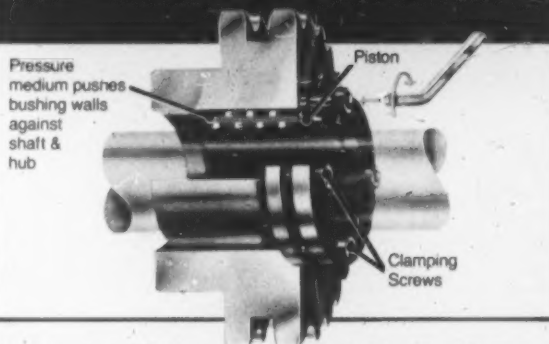
"The clarity in these latest guidelines," said Mr. Rule, "is that in our view they more accurately reflect the analysis we undertake when evaluating

The guidelines assert the government will be more likely to challenge a proposed merger in a market that is "performing noncompetitively." In such a market, Justice said, the appearance is that firms "already have succeeded in overcoming, at least to some extent, the obstacle to effective collusion." Thus, the guidelines say, increased concentration through a merger could further facilitate the collusion that already exists. □



TAKE A BITE OUT OF CRIME

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For information, Circle 162

3rd QUARTER EARNINGS

PRODUCERS ARE STILL WAITING FOR AN UPTURN

BY GEORGE MCMANUS & ROBERT REGAN

Steel

The steel industry lost more than a quarter of a billion dollars in the third quarter of 1984.

The aggregate loss would have been greater had it not been for the profit United States Steel Corp. derived from Marathon Oil.

Of the six largest mills, losses were reported by four: Bethlehem Steel Corp., Armco, Inc., National Inter-group, Inc., and LTV Corp.

The only positive thing about the quarter was that it indicated a potential for future profitability. With production down near 50 pct of capacity, U.S. Steel made a little money on steel operations in the third quarter. Bethlehem and Inland also had small operating profits.

The harsh cutbacks of the past three years have clearly lowered steelmaking costs. If prices and shipments ever rise to normal levels, there could be spectacular steel profits.

Unhappily, all movement was downward in the third quarter. The usual seasonal lag was compounded by continued heavy imports, inventory cutting of service centers, and uncertainty about an auto strike. All these negative factors were imports on a steel market that was only fair to start with.

The result was that steel shipments fell from a mediocre 20 million tons in the second quarter to a little over 17 million tons in the third quarter. Steel prices, which had started to firm in the first half, went into another nosedive.

"You have a lot of capacity chasing fewer orders," said David M. Roderick, chairman of U.S. Steel. "The price competition in this industry is horrendous. Prices are back where they were in the 1981-82 period."

Mr. Roderick deplored the tactics of some competitors and warned that his company intended to defend its market turf. "U.S. Steel is going to be competitive," he said.

He expressed hope that the Reagan import program would roll back imports and thereby add as much as 10 million tons to 1985 shipments of domestic mills.

Both Bethlehem and U.S. Steel benefitted from pension fund adjustments. For U.S. Steel, the adjustment reduced operating costs by \$135 million in the third quarter. Bethlehem had a third quarter cost reduction of \$32 million.

Weirton Steel Corp. continued as a star performer in the third quarter. Weirton's profit of \$15.8 million in the quarter was second only to U.S. Steel's. Weirton's 6.1 pct return on sales was topped by the 7.1 pct of Nucor Corp.

"Considering the downward market slide, third quarter profit was respectable," said Robert L. Loughhead, president of Weirton.

Interlake Inc. also continued its winning ways. Interlake's third quarter profit of \$10.1 million came to 4.3 pct of sales. Operating without blast furnaces or oxygen vessels, CF&I Steel Corp. earned \$3.4 million.

The new combine, LTV Steel, wasn't off to a rousing start in the third quarter. There was an operating loss of \$35.4 million for the steel group. With interest and corporate office expense subtracting \$72.4 million, the net loss for the parent company, LTV Corp., was nearly \$80 million.

In reporting the loss, LTV announced it had suspended the payments of dividends on common stock. A meeting of debenture owners was called to secure permission to continue

payment of preferred stock dividends.

This gloomy situation didn't discourage all investors. "We maintain our purchase recommendation on the shares of LTV Corp.," said Michelle Applebaum of Salomon Brothers (Oct.8).

Armco Inc. has more bad news for shareholders. Armco had a net loss of \$272.7 million in the third quarter. Most of this was due to special charges of \$205 million on oilfield equipment. Another \$40 million was lost on finance and leasing businesses, which were discontinued in the third quarter. Armco's operating loss before taxes and all the special charges was \$22.7 million.

Inland Steel Co. had a third quarter net loss of \$37.9 million. Most of the loss was due to special charges of \$25.4 million. Inland had an operating profit of \$3.6 million in the third quarter.

Wheeling-Pittsburgh Steel Corp. had a net loss of \$9.9 million in the third quarter. "Depressed operating levels, and reduced sales volume along with substantial price discounting, resulted in losses for the third quarter and the first nine months," said Dennis J. Carney, chairman of Wheeling-Pittsburgh.

The effect of price cutting was shown when Wheeling-Pittsburgh's sales increased only 45 pct in the first nine months while shipments rose 57 pct.

Nonferrous

There wasn't much to write home about in the third quarter showing of leading nonferrous metals companies. Gainers outnumbered losers by about two to one in the profits column and sales were up for all but a few, but rates of return on sales or investment remained below par.

(Cont. on p.81)

The aluminum companies continued to have a better time of it than the copper and nickel producers, although in most cases third quarter results were below the previous period. Primary aluminum prices softened in the third quarter, dampening pricing sentiment in some mill product lines along the way, and a considerable chunk in the reported rate of increase in consumption of aluminum products was absorbed by a high rate of imports drawn here by the strong U.S. dollar.

North America's four largest aluminum companies, Aluminum Co. of America, Alcan Aluminum Ltd., Reynolds Metals Co. and Kaiser Aluminum & Chemical corp., showed a 6.8 pct increase in aggregate sales to \$4.56 billion, but their aggregate shipments were off 6.2 pct to 1.46 million short tons. Kaiser Aluminum, the only one of the four to show increased third quarter shipments, was the only one with a third quarter net loss. Alumax Inc., owned by Amax Inc. and Japanese interests, showed higher third quarter profits reflecting a non-recurring adjustment to DISC deferred income taxes. Revere Copper & Brass said its aluminum mill product sector was the principal contributor to third quarter operating net income, particularly the Scottsboro aluminum sheet mill, which operated at a loss in the third quarter last year.

Alcoa said ingot prices were down nearly 38 pct in the third quarter and price softening on some common alloy aluminum products sold mainly to the automotive and housing industries was continuing. The company also said these items came under strong pressure from imports, particularly sheet and plate. Alcoa said it expected continued strong demand for aluminum overall, which may help ease the pressure on prices. Ingot prices began strengthening on the international market as the fourth quarter got under way, reflecting mainly extension of production cutting from the U.S. to other countries, notably Canada.

Alcan said a drop in profits from second quarter levels reflected lower margins on sales of fabricated items and an 11 pct drop in average ingot product

realizations. It said the largest erosion of earnings was in its North American operations.

Asarco and Phelps Dodge found that most of the fundamentals for copper continued to improve in the third quarter—except the copper price. Phelps Dodge said the softer tone to copper prices in the third quarter took place despite strong demand and reductions in copper inventories, which it said still were above normal levels. Asarco noted that hedge market stocks were down about 45 pct from their peak in January 1984, but copper prices fell in September to their lowest level since the recession began. The company said the September drop also reflected the adverse decision by the Reagan Administration on the producers' drive for import relief and the strong U.S. dollar.

Amax said an improvement in pre-tax earnings reflected reduced molybdenum losses because of reduced production costs and better shipping volume. Higher sales of molybdenum, iron ore and agricultural chemicals were mainly offset by decreased sales of copper, lead and zinc, Amax said.

Inco Ltd. narrowed its loss to \$31.6 million from \$61.3 million in the third quarter last year through reduced units costs in both primary metals and alloy products operations. Shipments of nickel and copper were higher, as were deliveries of platinum group metals, silver and cobalt. Inco said its inventory of finished nickel edged up to 85 million lbs at the end of the third quarter from 83 million lbs at the start of the year, but has been as high as 94 million lbs at midyear.

Falconbridge Ltd. had operating income of \$3.4 million, compared with an operating loss of \$1.8 million in the third quarter last year. An extraordinary gain of \$28.4 million from a gain on the sale of stock in Superior Oil Co. and a tax-loss carry-forward pushed the company's third quarter net income up to \$31.8 million from \$14.8 million in the same period last year, which included a non-recurring gain of \$14.8 million on a stock transaction.

Please turn to page 82 for an earnings statement of ferrous and nonferrous industries. □

IN SOME COUNTRIES, ECONOMY MEANS MAKING ONE BOWL OF RICE LAST THREE DAYS.



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STEEL TAKES A DRUBBING

THIRD QUARTER PROFIT REPORT—1984 (In Millions of Dollars)

	EARNINGS				SALES		
	1984 E/S	3rd Quarter 1984	3rd Quarter 1983	Pct Change	3rd Quarter 1984	3rd Quarter 1983	Pct Change
USS	3.2	\$153.00	\$ 52.00	+194	\$4,728.00	\$4,597.00	+2.8%
BETHLEHEM	—	(17.40)	(42.90)	—	1,363.50	1,221.80	+12%
ARMCO	—	(272.70)	(421.50)	—	1,141.50	1,030.50	+11%
NATIONAL	1.4	7.57	18.21	-58	548.38	678.56	-19%
INLAND	—	(37.93)	(21.25)	—	800.17	761.16	+5%
LTV	—	(79.80)	(49.70)	—	2,049.90	1,173.70	+75%
TOTAL	—	(247.26)	(465.14)	—	10,631.45	9,462.72	+12%
CYCLOPS	1.4	4.22	(2.17)	—	302.54	259.54	+17%
WHEEL-PGH	—	(9.91)	(9.89)	—	260.02	186.71	+39%
WEIRTON	6.2	15.84	—	—	256.11	—	—
INTERLAKE	4.3	10.14	6.82	+49	236.64	201.32	+18%
CARPENTER	2.9	3.62	2.69	+35	126.74	102.70	+23%
COPPERWELD	—	(1.97)	(6.51)	—	108.86	80.74	+35%
LUKENS	1.3	1.33	(4.73)	—	102.60	85.07	+21%
QUANEX	2.0	2.03	(0.11)	—	99.84	76.20	+31%
CF&I	4.2	3.40	(13.02)	—	80.53	62.51	+29%
LACLEDE	2.4	1.37	1.09	+26	55.93	48.96	+14%
EASTMET	—	(7.93)	(3.51)	—	52.23	47.61	+9.7%
PHOENIX	—	(0.94)	(6.16)	—	30.82	25.75	+20%
FLORIDA	2.2	1.65	(1.25)	—	73.73	65.21	+13%
NUCOR	7.1	11.77	7.36	+60	165.52	145.19	+14%

NONFERROUS FAILS TO SHINE

THIRD QUARTER PROFIT—1984 (In Millions of Dollars)

() = Denotes Loss

	Earnings			Sales and Other Revenues		
	3rd Q 1984	3rd Q 1983	Pct Chg.	3rd Q 1984	3rd Q 1983	Pct Chg.
ALCAN	\$52.0	\$27.0	+92.5	\$1,348.0	\$1,323.0	+1.9
ALCOA	60.1	57.7	+4.3	1,429.1	1,393.7	+2.5
ALUMAX	33.0	25.0	32.0	457.0	416.0	+9.9
AMAX	3.1	(52.2)	—	559.5	548.5	+2.0
ASARCO	(10.1)	2.9	—	287.2	386.8	-25.7
BRUSH WELLMAN	10.9	6.4	+71.5	78.2	61.1	+28.0
CALLAHAN MINING	(0.2)	1.4	—	4.5	7.3	-38.8
COMINCO	4.0	(17.7)	—	403.0	305.9	+31.7
ENGLEHARD	25.8	19.1	+35.5	619.9	397.1	+56.1
FALCONBRIDGE LTD.	31.8	13.0	+144.8	185.5	145.5	+27.5
FREEMONT MCMORAN	21.3	28.5	-25.2	205.3	194.7	+5.5
INCO LTD.	(31.6)	(61.3)	—	323.0	265.0	+21.9
KAISER ALUMINUM	(73.2)	(36.8)	—	840.3	655.3	+28.2
MARTIN MARIETTA	(324.0)	33.1	—	1,005.6	810.9	+24.0
NEWMONT MINING	12.2	16.8	-27.1	200.1	191.2	+4.6
NORANDA	(49.1)	(7.3)	—	814.9	788.1	+3.4
OLIN CORP.	16.3	12.0	+25.8	497.6	486.3	+2.3
OREGON MET	1.6	(0.2)	—	13.9	6.1	+127.9
PHELPS DODGE	(24.5)	(28.4)	—	205.6	236.9	-13.2
REVERE	10.4	3.1	+232.4	144.9	121.5	+19.3
REYNOLDS METALS	39.3	17.9	+119.6	940.7	893.9	+5.2
VULCAN MATERIALS	28.7	20.7	+38.3	266.9	233.8	+14.1

Alcan Aluminum Ltd.: Results for the '84 period include an after-tax provision of \$5.3 million for planned rationalization of extrusion operations in Canada. **Aluminum Co. of America:** Results for the '84 period include LIFO inventory profits of \$16.5 million and an extraordinary gain of \$9.7 million from the exchange of common stock for sinking fund debentures. **Alumax Inc.:** Net for the '84 period includes a non-recurring \$14.3 million adjustment to the Domestic International Sales Corp. (DISC) deferred income taxes as a result of new federal legislation. **Amax Inc.:** Results for the '84 period include gains of \$9 million on sales of interest rate swaps. Pretax earnings from operations were \$48 million, compared with \$1 million in the '83 period. **Cominco Ltd.:** Canadian funds. **Falconbridge Ltd.:** Canadian funds. Net income includes an extraordinary gain of \$28.4 million in the '84

period from sale of Superior Oil Co. stock and tax-loss carry-forward and \$14.8 million in the '83 period from sale of shares by a subsidiary. **Kaiser Aluminum & Chemical Corp.:** Net losses include losses from discontinued operations totaling \$50.7 million in the '84 period and \$17.8 million in the '83 period. **Martin Marietta Corp.:** Net for the '84 period includes \$369.5 million loss from discontinued operations. Results for the '83 period includes \$5.8 million gain from sale of assets. **Noranda Inc.:** Canadian funds. **Revere Copper & Brass Inc.:** Net for the '83 period includes a \$462,000 credit from a tax-loss carry-forward. **Reynolds Metals Co.:** Net for the '84 period includes a charge of \$11.6 million from shutdown of certain facilities.

PRICE & PRODUCTION DATA

(Effective November 5, 1984)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	128	129	135	179
Pittsburgh	182	201	204	233
Youngstown	89	95	95	112
Lake Erie	127	134	145	142
Detroit	130	137	130	138
Chicago	412	432	344	497
Cincinnati	81	80	82	76
St. Louis	72	64	76	75
Southern	164	171	151	139
Western	67	74	65	73
U.S. Production	1,452	1,517	1,427	1,673

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural).....gross-ton 80.50-86.9*
 Mesabi, regular-unscreened.....gross-ton \$32.53
 Mesabi, non-bessemer.....gross-ton \$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81.

86.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

**Effective 6/1/83.

NONFERROUS PRICES

(Effective November 5, 1984) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	50.94	48.85	11/5/84
Copper (C)	65.00-67.00	64.00-65.00	11/2/84
Lead	23.00-26.00	22.00-26.00	11/1/84
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	216.54	217.81	11/5/84
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	45.00	45.00-48.00	9/21/84

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. Canada. ZINC: high grade.

Antimony, American Laredo, Texas. \$2.00
 Beryllium-aluminum 5% Be, per lb. contained Be.....\$230.00
 Beryllium-copper, per lb. cont. Be.....\$140.00
 Beryllium 97% powder 200.....\$178.00
 Cadmium, ton lots.....\$1.55
 Calcium, ton lots, crown.....\$3.58
 Chromium, 99.8%.....\$3.75
 Cobalt, 99%, cathode.....\$12.50
 Gold per troy oz.....\$342.45
 Indium, dollars per troy oz.....\$3.30
 Iridium, dollars per troy oz.....\$450
 Magnesium sticks, 10,000 lbs.....\$1.97
 Mercury, per 76-lb. f.o.b. N.Y.....\$327-\$335
 Molybdenum, lb. tech. moly oxides, 20 lb. MO can.....\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective November 5, 1984)

	Last Week	Two Weeks Ago	To Date 1984	To Date 1983
U.S. Steel Production				
Net tons, in thousands	1,452	1,517	79,131	69,144
Capability Utilization Rate	56.1	58.6	69.5	54.4

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (\$/lb.—eff. 7/1/84)	27.582	27.582	27.582	26.822
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$ 79.50	\$ 80.50	\$ 83.50	\$ 73.17
No. 2 bundles	\$ 50.83	\$ 50.83	\$ 51.50	\$ 47.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh..	\$ 81.50	\$ 84.50	\$ 88.50	\$ 84.50
No. 1 steel, Philadelphia..	76.50	78.50	80.50	73.50
No. 1 steel, Chicago.....	80.50	78.50	81.50	79.50
No. 1 bundles, Detroit.....	64.50	65.50	75.50	81.50
Low Phos., Youngstown..	72.50	72.50	78.50	84.50
No. 1 mach'y cast., Pgh...	66.50	66.50	71.50	74.50
No. 1 mach'y cast., Phila.	98.50	98.50	98.50	95.50
No. 1 mach'y cast., Chi..	110.50	110.50	113.50	109.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR).....	\$3.29
Palladium, per troy oz.....	\$141
Platinum, per troy oz.....	\$322
Rhodium, per troy oz.....	\$800
Silver ingots, per troy oz.....	\$7.59
Vanadium.....	\$6.00
Zirconium sponge.....	\$12.00-\$17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Oct. 29—550.05	Nov. 1—552.03
Oct. 30—550.05	Nov. 2—555.95
Oct. 31—550.18	

Scrap Prices**Brass Mill Scrap**

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper.....	57½	56½
Yellow brass.....	53¾	54
Red brass.....	54¾	53¾
Comm. bronze.....	54¾	53¾
Mang. bronze.....	55	53½
Free cutting rod ends.....	56¾	48

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire.....	55
No. 2 copper wire.....	46
Light copper.....	37

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire.....	51
No. 2 copper wire.....	42
Light copper.....	33
No. 1 composition.....	45
No. 1 comp. turnings.....	42
Hvy. yellow brass solids.....	34
Hvy. yellow brass turnings.....	31
Radiators.....	37

Aluminum		
New mixed clips.....	34	—35
Old sheet.....	32	—33
Old cast.....	32	—33
Clean dry borings.....	32	—33

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum		
Segregated clippings.....	27	—29
Mixed L.C. clips.....	24	—26
Old sheets and cast.....	22	—23
Borings and turnings.....	18	—20
Duraluminum clippings.....	24	—25

Copper and Brass

No. 1 copper wire.....	42	—43
No. 2 copper wire.....	34	—35
Light copper.....	29	—30
Radiators.....	31	—32
No. 1 composition.....	40	—41
No. 1 composition turn'gs.....	37	—38
Cocks and faucets.....	27	—28
Clean heavy yellow brass.....	28	—29
Brass Pipe.....	29	—30
New soft brass clippings.....	41	—42

Lead

Heavy soft lead.....	9	—10
Whole batteries.....	3	—4
Type metal.....	16	—17
Electrotype.....	13	—14

Nickel

Nickel solids.....	115	—120
Nickel rod ends.....	115	—120
Nickel sheets, clips.....	115	—120
Nickel turnings.....	40	—45

Zinc

New zinc clippings.....	18	—19
Old diecast zinc.....	14	—15

EFFECTIVE NOV. 5, 1984

(Effective November 5, 1984) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 81.00 to \$ 82.00
No. 2 hvy. melting	71.00 to 72.00
No. 1 dealer bundles	84.00 to 85.00
No. 1 factory bundles (auto)	86.00 to 90.00
No. 2 bundles	52.00 to 53.00
No. 1 busheling	88.00 to 90.00
Machine shop turn.	10.00 to 11.00
Shoveling turnings	51.00 to 52.00
Cast iron borings	48.00 to 50.00
Low phos. punchings plate	96.00 to 100.00
Heavy turnings	71.00 to 72.00
No. 1 RR hvy. melting	90.00 to 91.00
Rails, 2 ft. and under	105.00 to 106.00
Scrap rails, random lgh.	96.00 to 97.00
RR specialties	102.00 to 103.00
No. 1 machinery cast	86.00 to 87.00
Cupola cast	58.00 to 60.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	560.00 to 570.00
18-8 turnings	480.00 to 470.00

Chicago

No. 1 hvy. melting	\$ 80.00 to \$ 81.00
No. 2 hvy. melting	74.00 to 75.00
No. 1 dealer bundles	90.00 to 91.00
No. 1 factory bundles (auto)	88.00 to 90.00
No. 2 dealer bundles	51.00 to 52.00
No. 1 busheling	91.00 to 92.00
Shredder scrap	91.00 to 92.00
Machine shop turn.	43.00 to 44.00
Mixed bor. and turn.	44.00 to 45.00
Shoveling turnings	48.00 to 49.00
Cast iron borings	48.00 to 49.00
Low phos. forge crop	114.00 to 115.00
Low phos. punchings plate	
1/2 in. and heavier	124.00 to 125.00
Low phos. 2 ft. and under	119.00 to 120.00
No. 1 RR hvy. melting	86.00 to 87.00
Scrap rails, random lgh.	88.00 to 89.00
Reverber rails	96.00 to 100.00
Rails, 2 ft. and under	113.00 to 114.00
RR couplers and truckles	90.00 to 91.00
RR car axles	123.00 to 124.00
No. 1 machinery cast	110.00 to 111.00
Cupola cast	95.00 to 100.00
Stove plate	94.00 to 95.00
Steel car wheels	100.00 to 101.00
Stainless	
18-8 bundles and solids	490.00 to 500.00
18-8 turnings	420.00 to 430.00
430 bundles and solids	120.00 to 125.00
430 turnings	80.00 to 90.00

Philadelphia

No. 1 hvy. melting	\$ 75.00 to \$ 78.00
No. 2 hvy. melting	68.00 to 71.00
No. 1 dealer bundles	90.00 to 93.00
No. 2 dealer bundles	47.00 to 50.00
No. 1 busheling	90.00 to 93.00
Shredder scrap	95.00 to 98.00
Machine shop turn.	28.00 to 32.00
Mixed bor. and turn.	23.00 to 32.00
Shoveling turnings	38.00 to 41.00
Low phos. 5 ft. and under	87.00 to 90.00
Low phos. 2 ft. punchings	112.00 to 115.00
Electric furnace bundles	95.00 to 98.00
RR specialties	93.00 to 96.00
Rails, 2 ft. and under	113.00 to 116.00
Cupola cast	78.00 to 81.00
Heavy breakable cast	57.00 to 60.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 52.00 to \$ 53.00
No. 2 hvy. melting	51.00 to 52.00
No. 1 dealer bundles	64.00 to 65.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	63.00 to 64.00
Drop forge flashings	40.00 to 41.00
Machine shop turn.	44.00 to 45.00
Mixed borings and turn.	21.00 to 22.00
Shoveling turnings	45.00 to 46.00
Cast iron borings	31.00 to 32.00
Heavy breakable cast	40.00 to 41.00
Mixed cupola cast	58.00 to 57.00
Automobile cast	60.00 to 61.00
Stainless	
18-8 bundles and solids	465.00 to 465.00
18-8 turnings	380.00 to 370.00
430 bundles and solids	110.00 to 120.00

Youngstown

No. 1 hvy. melting	\$ 59.00 to \$ 62.00
No. 2 hvy. melting	42.00 to 45.00
No. 1 dealer bundles	71.00 to 74.00
No. 2 dealer bundles	26.00 to 38.00
Machine shop turn.	11.00 to 14.00
Shoveling turnings	16.00 to 19.00
Low phos. plate	71.00 to 74.00
Electric furnace bundles	69.00 to 72.00
Galvanized bundles	59.00 to 62.00

Cleveland

No. 1 hvy. melting	\$ 53.00 to \$ 56.00
No. 2 hvy. melting	37.00 to 40.00
No. 1 dealer bundles	65.00 to 68.00
No. 1 factory bundles	77.00 to 80.00
No. 2 bundles	19.00 to 22.00
No. 1 busheling	67.00 to 70.00
Machine shop turn.	6.00 to 9.00
Mixed bor. and turn.	6.00 to 9.00
Shoveling turnings	7.00 to 10.00
Cast iron borings	10.00 to 13.00
Cut structural & plate,	
2 ft. and under	100.00 to 103.00
Low phos. punchings plate	100.00 to 103.00
Drop forge flashings	35.00 to 38.00
Foundry steel, 2 ft. & under	57.00 to 60.00
No. 1 RR hvy. melting	75.00 to 78.00
Rails, 2 ft. and under	105.00 to 108.00
Rails, 18 in. and under	106.00 to 109.00
Mixing turnings	58.00 to 59.00
Railroad cast	86.00 to 91.00
No. 1 machinery cast	99.00 to 101.00
Cupola cast	55.00 to 58.00
Stove plate	41.00 to 44.00
Stainless	
18-8 bundles	375.00 to 385.00
18-8 turnings	325.00 to 335.00
430 bundles	80.00 to 85.00

Buffalo

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 62.00 to \$ 63.00
No. 2 hvy. melting	51.00 to 52.00
No. 1 busheling	77.00 to 78.00
No. 1 dealer bundles	76.00 to 77.00
No. 2 bundles	36.00 to 37.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	20.00 to 21.00
Low phos. plate	62.00 to 63.00
Structural and plate,	
2 ft. and under	95.00 to 96.00
Rails, 2 ft. and under	95.00 to 96.00
Scrap rails, random lgh.	72.00 to 73.00
No. 1 machinery cast	78.00 to 79.00
No. 1 cupola cast	58.00 to 59.00

St. Louis

No. 1 hvy. melting	\$ 62.00 to \$ 63.00
No. 2 hvy. melting	51.00 to 52.00
Foundry steel, 2 ft.	62.00 to 63.00
No. 1 dealer bundles	62.00 to 63.00
No. 2 bundles	48.00 to 47.00
Machine shop turn.	17.00 to 16.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	27.00 to 26.00
No. 1 RR hvy. melting	68.00 to 63.00
Rails, random length	61.00 to 66.00
Rails, 1/2 in. and under	85.00 to 86.00
RR specialties	82.00 to 83.00
Cupola cast	72.00 to 73.00
Heavy breakable cast	50.00 to 51.00
Stove plate	63.00 to 64.00
Steel car wheels	96.00 to 97.00
Rerolling rails	80.00 to 81.00
Unstripped motor blocks	61.00 to 62.00

Birmingham

No. 1 heavy melting	\$ 70.00 to \$ 71.00
No. 2 heavy melting	65.00 to 66.00
No. 1 dealer bundles	71.00 to 72.00
No. 2 bundles	49.00 to 50.00
No. 1 busheling	71.00 to 72.00
Shredder scrap	94.00 to 95.00
Machine shop turn.	23.00 to 24.00
Shoveling turnings	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Electric furnace bundles	68.00 to 69.00
Elec. furnace, 3 ft. & under	70.00 to 71.00
Structural and plate, 2 ft.	98.00 to 100.00
Structural and plate, 4 ft.	98.00 to 100.00
No. 1 RR hvy. melting	69.00 to 70.00
Scrap rails, random lgh.	85.00 to 86.00
Rails, 2 ft. and under	103.00 to 104.00
Angles and splice bars	88.00 to 90.00
No. 1 cupola cast	86.00 to 87.00
Unstripped motor blocks	67.00 to 68.00

Cincinnati

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 51.00 to \$ 52.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	63.00 to 64.00
No. 2 bundles	27.00 to 28.00
Machine shop turn.	4.00 to 5.00
Shoveling turnings	6.00 to 7.00
Cast iron borings	17.00 to 18.00
Low phos. 18 in. and under	86.00 to 88.00
Rails, random length	86.00 to 87.00
Rails, 2 ft. and under	80.00 to 81.00
No. 1 cupola cast	57.00 to 58.00
Heavy breakable cast	26.00 to 27.00
Drop broken cast	78.00 to 79.00

New York

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 48.00 to \$ 50.00
No. 2 hvy. melting	36.00 to 41.00
No. 2 dealer bundles	23.00 to 27.00
Mixed bor. and turn.	11.00 to 13.00
Machine shop turn.	6.00 to 7.00
Shoveling turnings	14.00 to 15.00
Clean cast. chem. borings	36.00 to 38.00
No. 1 machinery cast	88.00 to 90.00
Mixed yard cast	50.00 to 51.00
Heavy breakable cast	19.00 to 12.00
Stainless	
18-8 prepared coils	490.00 to 510.00
18-8 prepared	390.00 to 410.00
430 prepared coils	90.00 to 110.00
410 solids	80.00 to 91.00

Boston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 63.00 to \$ 66.00
No. 2 hvy. melting	53.00 to 55.00
No. 1 dealer bundles	63.00 to 65.00
No. 2 bundles	37.00 to 39.00
No. 1 busheling	70.00 to 72.00
Shredder scrap	70.00 to 72.00
Machine shop turn.	12.00 to 14.00
Shoveling turnings	20.00 to 22.00
No. 1 machinery cast	83.00 to 88.00
Mixed cupola cast	50.00 to 52.00
Heavy breakable cast	6.00 to 10.00

San Francisco

No. 1 hvy. melting	\$ 44.00 to \$ 46.00
No. 2 hvy. melting	36.00 to 40.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 dealer bundles	19.00 to 20.00
Machine shop turn.	6.00 to 8.00
Cast iron borings	6.00 to 8.00
No. 1 cupola cast	81.00 to 83.00

Los Angeles

No. 1 hvy. melting	\$ 45.00 to \$ 47.00
No. 2 hvy. melting	36.00 to 40.00
No. 1 dealer bundles	36.00 to 38.00
No. 2 dealer bundles	18.00 to 20.00
Machine shop turn.	12.00 to 14.00
Shoveling turnings	6.00 to 10.00
Cast iron borings	6.00 to 8.00
Elec. furnace, 1 ft. and under	74.00 to 76.00
(foundry)	75.00 to 77.00
No. 1 cupola cast	75.00 to 77.00

Seattle

No. 1 hvy. melting	\$ 68.00 to \$ 70.00
No. 2 hvy. melting	57.00 to 59.00
No. 2 bundles	40.00 to 42.00
No. 1 cupola cast	82.00 to 83.00
Mixed yard cast	82.00 to 84.00

Hamilton, Ont.

Brokers buying price per net ton on cars:	
No. 1 heavy melting	\$ 91.00
No. 2 heavy melting cut 2 ft. and under	87.00
No. 1 dealer bundles	92.00
No. 2 bundles	53.00
Mixed steel scrap	62.00
Bush, new fact. prep'd.	93.00
Bush, new fact. unprep'd.	93.00
Machine shop turn.	38.00
Short steel turn.	38.00
Mixed bor. and turn.	38.00
Cast scrap	79.00

Houston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 69.00 to \$ 70.00
No. 2 hvy. melting	56.00 to 57.00
No. 2 bundles	42.00 to 43.00
Machine shop turn.	13.00 to 14.00
Crushed turnings	31.00 to 32.00
Shredder scrap	73.00 to 74.00
Cut structural plate, 2 ft. and under	98.00 to 101.00
Cut structural plate, 5 ft. and under	85.00 to 86.00
Unstripped motor blocks	66.00 to 67.00
Cupola cast	77.00 to 78.00

PRODUCER PRICES CONTINUE TO FALL

Producer prices in September fell for the second consecutive month, slightly more than the drop in the previous month, the U.S. Bureau of Labor Statistics reported.

The September drop was 0.2 pct compared with August's 0.1 pct. The September figure was the biggest drop since January 1983 when the index fell 0.7 pct.

The decline surprised several analysts who had expected a fairly large increase in September.

Through the three quarters of this year, inflation at the producer level is running at an annual rate of 1.9 pct, well below the pace many expected.

Among finished goods other than foods and energy, prices were unchanged in September continuing a pattern of stability. Capital equipment prices also were unchanged, following increases in July and August. That category represents 22.2 pct of the index.

Decreases for heavy trucks and cars and plastics industry machinery offset advances for light trucks, truck trailers and a few kinds of machinery. Auto prices dropped 4.7 pct, mechanical power transmission equipment went up 0.7 pct, and pumps and compressors cost 0.4 pct more in September.

Increases compared with August were logged by valves and fittings—0.1 pct—and miscellaneous metal products—0.2 pct. Prices for most nonferrous metals, particularly lead, continued to fall, down 1.7 pct.

The index for intermediate goods edged down 0.1 pct, on a seasonally adjusted basis, about the same as in both July and August.

For machine tools, both metal cutting and metal forming equipment prices rose in September, 0.4 pct and 0.1 pct, respectively.

Overall in September, of the 22 categories shown, 14 rose and six dropped compared with August.

Prices of railroad equipment and electric motors were unchanged.

Latest Month Covered: September 1984

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	386.8	+ 0.4	+ 2.7
Metal Forming Machine Tools	425.7	+ 0.1	+ 2.5
Agricultural Machinery & Equip.	337.9	+ 0.1	+ 2.9
Construction Machinery & Equip.	359.0	+ 0.1	+ 1.6
Industrial Process Furnace & Ovens	375.5	- 0.1	+ 3.3
Industrial Material Handling Equip.	290.6	+ 0.1	+ 1.9
Pumps, Compressors & Allied Equip.	349.6	+ 0.4	+ 1.0
Fluid Power Equip. (Dec. 1970 = 100)	260.9	+ 0.1	+ 2.8
Mechanical Power Transmission Equip.	330.2	+ 0.7	+ 4.6
Automobiles	211.0	- 4.7	+ 1.5
Motor Trucks—Light	267.8	- 4.9	+ 4.9
Motor Trucks—Heavy	331.5	- 1.0	+ 10.1
Railroad Equipment	364.6	0	+ 4.0
Fabricated Metal Structural Products	312.1	- 0.1	+ 2.6
Electric Motors	340.4	0	+ 1.5
Valves & Fittings	102.8	+ 0.1	+ 3.0
Ball & Roller Bearings	344.1	+ 0.1	+ 3.6
Cutting Tools & Accessories	280.1	+ 0.4	+ 1.9
Heating Equipment	257.5	+ 0.8	+ 4.4
Plumbing Fixtures & Brass Fittings	299.0	- 1.4	+ 2.3
Metal Containers	352.6	+ 0.1	+ 4.2
Miscellaneous Metal Products	+295.6	+ 0.2	+ 4.0

Data based on U.S. Labor Dept.'s Producer Price Index

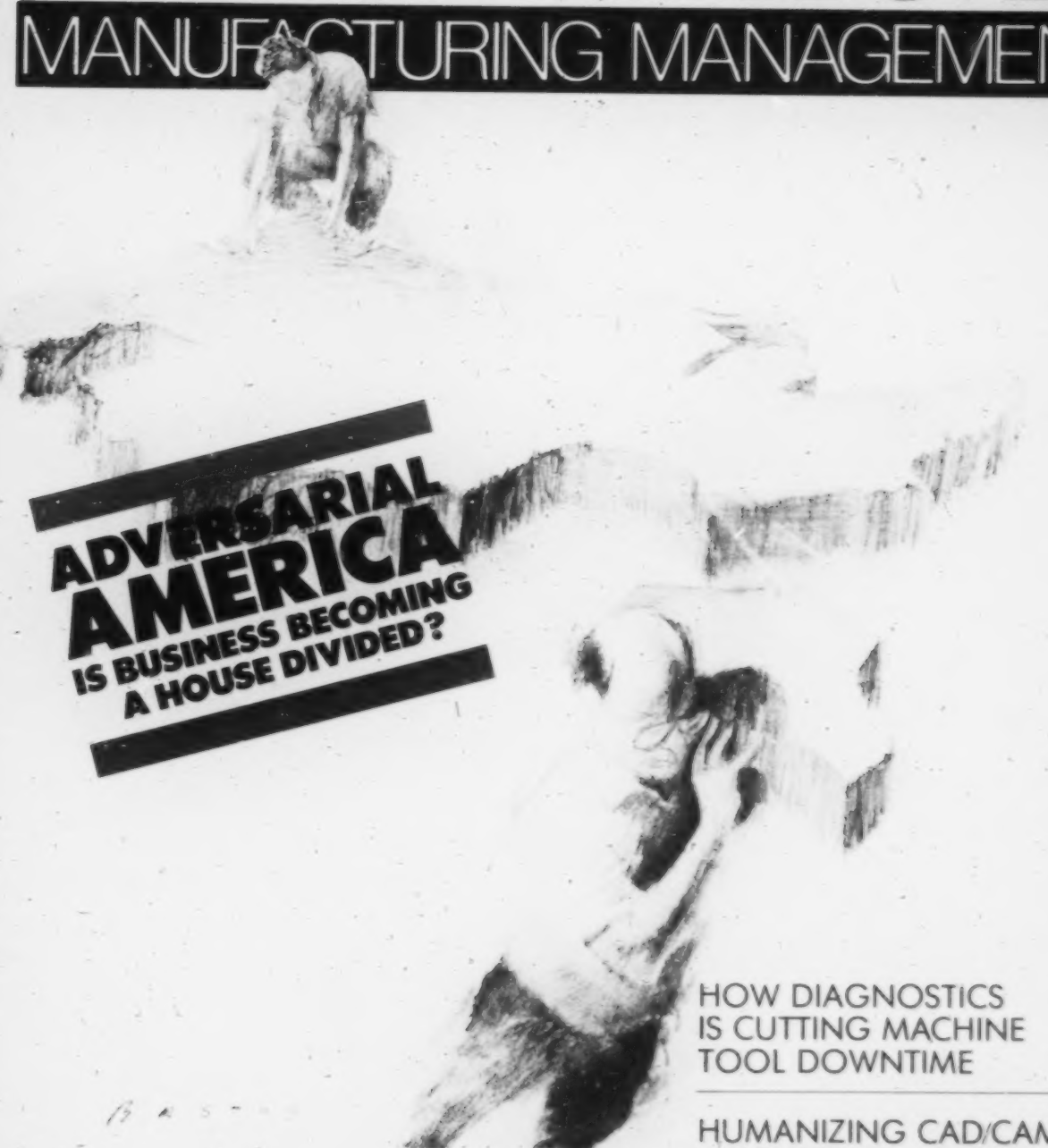
CHILTON'S

December 3, 1984

IRON AGE

C2150-8

MANUFACTURING MANAGEMENT



**ADVERSARIAL
AMERICA**
IS BUSINESS BECOMING
A HOUSE DIVIDED?

HOW DIAGNOSTICS
IS CUTTING MACHINE
TOOL DOWNTIME

HUMANIZING CAD/CAM
WORKSTATION DESIGN

ANOTHER DUPLEX STAINLESS
STEEL CATCHES ON

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MANUFACTURING MANAGEMENT



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PLANT SPENDING TURNS INSIDE OUT

How is capital spending doing? The question doesn't make much sense now that a two-tier investment pattern is in effect.

Investment in Capital Equipment by U.S. Industry			
In Billions of 1972 Dollars			
Investment Outlays Made For:	1980	1983	Pct. Change
*Products of Basic Goods Industries . . .	\$22.5	\$15.2	-32%
Office, Computing & Accounting Mach. . .	19.2	32.1	+66%
Source: U.S. Commerce Dept.			
*Agricultural Mach., Construction Mach., Mining & Oilfield Mach., General Industrial Machinery including Materials Handling Equipment, Metalworking Machinery.			

A highlight of the current expansion has been the red-hot pace of business investment in new plant and equipment.

For example, the overall economy—measured by real GNP—grew by 7.5 pct from the second quarter of 1983 to the same period this year. Over the same time span, real business investment in plant grew by 18 pct. And investment in capital equipment grew by 25 pct.

Not only has capital spending been the pace-setter in the current business recovery, but it has also been much stronger than in recent past recoveries. Investment grew at a 16 pct average annual rate during the first six quarters of this expansion, more than triple the 5 pct average gain during the same time span of the last three recovery periods.

Many executives in basic goods capital equipment lines openly question these figures. They have good reasons to be doubters. Their own order books tell a far different story.

The table here gives an idea of what has been going on in business investment. The 'mix' of this investment has changed radically in recent years. The change trend in the mix is not new, but recent data shows the extent and the accelerating pace.

In 1980, spending for capital goods produced by basic industries was greater than that for office, computing and accounting machinery—\$22.5 billion to \$19.3 billion.

But, by 1983, spending on basic goods capital items was down 32 pct to \$15.2 billion. At the same time, investment in office, computing and accounting machinery was up 66 pct to \$32.1 billion.

The basic industry capital goods include metalworking machinery, agricultural and construction equipment and mining and material handling equipment.

An irony in the changing mix is

that some of the biggest buyers of office, computing and accounting machinery have been companies in basic goods industries.

If there is a 'message' in this fast-changing mix of business capital investment, it is that the monitoring of aggregate data fails to indicate the magnitude and direction of U.S. industry investment.

Lopsided balance sheets pose a threat

The business recovery has been around for 23 months. Still, as analysts at Morgan Stanley & Co. note, "few companies have made an effort to strengthen their balance sheets."

Among nonfinancial corporations, short-term debt has swelled twice as rapidly as usual for this time in an expansion. Longer term debt has grown at half its normal pace. The danger, as seen by the bank's experts, is that companies "have been left with extraordinary exposure to higher interest rates."

The bank finds "little" protection on the asset side. The current ratio—ratio of liquid assets to short-term liabilities—noted bank economists, "has never looked worse at this stage of a business cycle."

If interest rates rise, there will be "a renewed round of pressure on the bottom line," said the analysts. One of the most vulnerable industries would be basic materials producers.

Analysts at Chase Manhattan Bank have also red-flagged the corporate balance sheet situation. They see a long-range problem. In checking debt-to-equity ratios, Chase economists note there has been some recovery-induced declines in the ratio. However, they caution, "while the ratio generally does fall off during an economic recovery, succeeding declines over the last 15 years have bottomed out at ever-higher levels."

BY JOHN D. BAXTER

PRICE & PRODUCTION DATA

(Effective November 12, 1984)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	127	128	181	182
Pittsburgh	195	182	187	236
Youngstown	90	89	73	81
Lake Erie	109	127	160	139
Detroit	143	130	143	131
Chicago	411	412	355	506
Cincinnati	84	81	89	85
St. Louis	68	72	50	74
Southern	176	164	161	155
Western	66	67	74	74
U.S. Production	1,469	1,452	1,473	1,672

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural).....	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81.

96.9¢—U. S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

**Effective 6/1/83.

NONFERROUS PRICES

(Effective November 12, 1984) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	52.58	50.94	11/12/84
Copper (C)	66.00-67.00	65.00-67.00	11/8/84
Lead	26.00	25.00-26.00	11/9/84
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	217.69	216.54	11/12/84
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	45.00	45.00-48.00	9/21/84

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. CANADA: ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$140.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.55
Calcium, ton lots, crown	\$3.58
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$345.75
Indium, dollars per troy oz.	\$3.30
Iridium, dollars per troy oz.	\$450
Magnesium sticks, 10,000 lbs.	\$1.97
Mercury, per 76-lb. f.o.b. N.Y.	\$327-339
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective November 12, 1984)

	Last Week	Two Weeks Ago	To Date 1984	To Date 1983
Net tons, in thousands	1,469	1,452	80,600	70,817
Capability Utilization Rate	56.7	56.1	69.2	54.5

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	26.822
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$ 79.17	\$ 79.50	\$ 85.17	\$ 80.50
No. 2 bundles	\$ 51.17	\$ 50.83	\$ 52.17	\$ 48.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh..	\$ 81.50	\$ 81.50	\$ 92.50	\$ 84.50
No. 1 steel, Philadelphia..	75.50	76.50	81.50	77.50
No. 1 steel, Chicago.....	80.50	80.50	81.50	79.50
No. 1 bundles, Detroit.....	64.50	64.50	77.50	81.50
Low Phos., Youngstown..	72.50	72.50	80.50	84.50
No. 1 mach'y cast., Pgh...	66.50	66.50	71.50	74.50
No. 1 mach'y cast., Phila.	98.50	98.50	98.50	95.50
No. 1 mach'y cast., Chi..	110.50	110.50	115.50	109.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR).....	\$3.29
Palladium, per troy oz.....	\$147
Platinum, per troy oz.....	\$336
Rhodium, per troy oz.....	\$800
Silver ingots, per troy oz.....	\$7.68
Vanadium.....	\$6.00
Zirconium sponge.....	\$12.00-\$17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Nov. 5—555.20	Nov. 8—555.24
Nov. 6—Holiday	Nov. 9—555.84
Nov. 7—554.65	

Scrap Prices

Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb)

	Solids	Turning
Copper.....	58½	50
Yellow brass.....	54½	51
Red brass.....	56½	50
Comm. bronze.....	57¼	50
Mang. bronze.....	57½	48
Free cutting rod ends.....	51	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire.....	56
No. 2 copper wire.....	47
Light copper.....	38

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire.....	52
No. 2 copper wire.....	43
Light copper.....	34
No. 1 composition.....	45
No. 1 comp. turnings.....	42
Hvy. yellow brass solids.....	34
Hvy. yellow brass turnings.....	31
Radiators.....	37

Aluminum	
New mixed clips.....	34 —35
Old sheet.....	32 —33
Old cast.....	32 —33
Clean dry borings.....	33 —34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings.....	27 —29
Mixed L.C. clips.....	24 —26
Old sheets and cast.....	22 —23
Borings and turnings.....	18 —20
Duraluminum clippings.....	24 —25

Copper and Brass

No. 1 copper wire.....	42 —43
No. 2 copper wire.....	34 —35
Light copper.....	29 —30
Radiators.....	31 —32
No. 1 composition.....	40 —41
No. 1 composition turn'gs.....	37 —38
Cocks and faucets.....	27 —28
Clean heavy yellow brass.....	28 —29
Brass Pipe.....	29 —30
New soft brass clippings.....	41 —42

Lead

Heavy soft lead.....	9 —10
Whole batteries.....	3 —4
Type metal.....	16 —17
Electrotype.....	13 —14

Nickel

Nickel solids.....	115 —120
Nickel rod ends.....	115 —120
Nickel sheets, clips.....	115 —120
Nickel turnings.....	40 —45

Zinc

New zinc clippings.....	18 —19
Old diecast zinc.....	14 —15

EFFECTIVE NOV. 12, 1984

(Effective November 12, 1984) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 81.00 to \$ 82.00
No. 2 hvy. melting	71.00 to 72.00
No. 1 dealer bundles	89.00 to 90.00
No. 1 factory bundles (auto)	89.00 to 90.00
No. 2 bundles	52.00 to 53.00
No. 1 busheling	89.00 to 90.00
Machine shop turn	10.00 to 11.00
Shoveling turnings	51.00 to 52.00
Cast iron borings	49.00 to 50.00
Low phos. punchings plate	99.00 to 100.00
Heavy turnings	71.00 to 72.00
No. 1 RR hvy. melting	90.00 to 91.00
Rails 2 ft. and under	105.00 to 106.00
Scrap rails, random lgth.	96.00 to 97.00
RR specialties	102.00 to 103.00
No. 1 machinery cast	66.00 to 67.00
Cupola cast	59.00 to 60.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	570.00 to 580.00
18-8 turnings	470.00 to 480.00

Chicago

No. 1 hvy. melting	\$ 80.00 to \$ 81.00
No. 2 hvy. melting	75.00 to 76.00
No. 1 dealer bundles	90.00 to 91.00
No. 1 factory bundles (auto)	89.00 to 90.00
No. 2 dealer bundles	54.00 to 55.00
No. 1 busheling	91.00 to 92.00
Shredder scrap	92.00 to 93.00
Machine shop turn	43.00 to 44.00
Mixed bor. and turn.	44.00 to 45.00
Shoveling turnings	48.00 to 49.00
Cast iron borings	48.00 to 49.00
Low phos. forge crop	114.00 to 115.00
Low phos. punchings plate	
1/2 in. and heavier	124.00 to 125.00
Low phos. 2 ft. and under	119.00 to 120.00
No. 1 RR hvy. melting	86.00 to 87.00
S. rap rails, random lgth.	88.00 to 89.00
Re-roller rails	99.00 to 100.00
Rails, 2 ft. and under	113.00 to 114.00
RR couplers and knuckles	90.00 to 91.00
RR car axles	123.00 to 124.00
No. 1 machinery cast	110.00 to 111.00
Cupola cast	99.00 to 100.00
Stove plate	94.00 to 95.00
Steel car wheels	100.00 to 101.00
Stainless	
18-8 bundles and solids	490.00 to 500.00
18-8 turnings	420.00 to 430.00
430 bundles and solids	120.00 to 125.00
430 turnings	80.00 to 90.00

Philadelphia

No. 1 hvy. melting	\$ 74.00 to \$ 77.00
No. 2 hvy. melting	66.00 to 69.00
No. 1 dealer bundles	87.00 to 90.00
No. 2 dealer bundles	45.00 to 48.00
No. 1 busheling	37.00 to 40.00
Shredder scrap	95.00 to 98.00
Machine shop turn	29.00 to 32.00
Mixed bor. and turn.	29.00 to 32.00
Shoveling turnings	38.00 to 41.00
Low phos. 5 ft. and under	84.00 to 87.00
Low phos. 2 ft. punchings	110.00 to 113.00
Electric furnace bundles	95.00 to 98.00
RR specialties	90.00 to 93.00
Rails, 2 ft. and under	112.00 to 115.00
Cupola cast	78.00 to 81.00
Heavy breakable cast	57.00 to 60.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Broker buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 52.00 to \$ 53.00
No. 2 hvy. melting	51.00 to 52.00
No. 1 dealer bundles	64.00 to 65.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	63.00 to 64.00
Drop forge flashings	40.00 to 41.00
Machine shop turn	44.00 to 45.00
Mixed borings and turn.	21.00 to 22.00
Shoveling turnings	45.00 to 46.00
Cast iron borings	31.00 to 32.00
Heavy breakable cast	40.00 to 41.00
Mixed cupola cast	56.00 to 57.00
Automobile cast	80.00 to 81.00
Stainless	
18-8 bundles and solids	455.00 to 465.00
18-8 turnings	360.00 to 370.00
430 bundles and solids	110.00 to 120.00

Youngstown

No. 1 hvy. melting	\$ 59.00 to \$ 62.00
No. 2 hvy. melting	42.00 to 45.00
No. 1 dealer bundles	71.00 to 74.00
No. 2 dealer bundles	35.00 to 38.00
Machine shop turn	11.00 to 14.00
Shoveling turnings	16.00 to 19.00
Low phos. plate	71.00 to 74.00
Electric furnace bundles	69.00 to 72.00
Galvanized bundles	59.00 to 62.00

Cleveland

No. 1 hvy. melting	\$ 53.00 to \$ 56.00
No. 2 hvy. melting	37.00 to 40.00
No. 1 dealer bundles	65.00 to 68.00
No. 1 factory bundles	77.00 to 80.00
No. 2 bundles	19.00 to 22.00
No. 1 busheling	67.00 to 70.00
Machine shop turn	5.00 to 8.00
Mixed bor. and turn.	9.00 to 10.00
Shoveling turnings	7.00 to 10.00
Cast iron borings	10.00 to 13.00
Cut structural & plates, 2 ft. and under	100.00 to 103.00
Low phos. punchings plate	100.00 to 103.00
Drop forge flashings	35.00 to 38.00
Foundry steel, 2 ft. & under	57.00 to 60.00
No. 1 RR hvy. melting	75.00 to 78.00
Rails, 2 ft. and under	105.00 to 108.00
Rails, 18 in. and under	106.00 to 109.00
Steel axle turnings	56.00 to 59.00
Railroad cast	89.00 to 91.00
No. 1 machinery cast	99.00 to 101.00
Cupola cast	55.00 to 58.00
Stove plate	41.00 to 44.00
Stainless	
18-8 bundles	375.00 to 385.00
18-8 turnings	325.00 to 335.00
430 bundles	80.00 to 85.00

Buffalo

Broker buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 62.00 to \$ 63.00
No. 2 hvy. melting	51.00 to 52.00
No. 1 busheling	72.00 to 73.00
No. 1 dealer bundles	71.00 to 72.00
No. 2 bundles	36.00 to 37.00
Machine shop turn	12.00 to 13.00
Mixed bor. and turn.	11.00 to 12.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	20.00 to 21.00
Low phos. plate	92.00 to 93.00
Structural and plate, 2 ft. and under	95.00 to 96.00
Rails, 2 ft. and under	95.00 to 96.00
Scrap rails, random lgth.	72.00 to 73.00
No. 1 machinery cast	78.00 to 79.00
No. 1 cupola cast	58.00 to 59.00

St. Louis

No. 1 hvy. melting	\$ 62.00 to \$ 63.00
No. 2 hvy. melting	51.00 to 52.00
Foundry steel, 2 ft.	62.00 to 63.00
No. 1 dealer bundles	62.00 to 63.00
No. 2 bundles	46.00 to 47.00
Machine shop turn	17.00 to 18.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	27.00 to 28.00
No. 1 RR hvy. melting	62.00 to 63.00
Rails, random length	67.00 to 68.00
Rails, 18 in. and under	85.00 to 86.00
RR specialties	82.00 to 83.00
Cupola cast	72.00 to 73.00
Heavy breakable cast	50.00 to 51.00
Stove plate	83.00 to 84.00
Steel car wheels	96.00 to 97.00
Re-rolling rails	80.00 to 81.00
Unstripped motor blocks	61.00 to 62.00

Birmingham

No. 1 heavy melting	\$ 70.00 to \$ 71.00
No. 2 heavy melting	65.00 to 66.00
No. 1 dealer bundles	71.00 to 72.00
No. 2 bundles	71.00 to 72.00
No. 1 busheling	94.00 to 95.00
Shredder scrap	23.00 to 24.00
Machine shop turn	23.00 to 24.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	38.00 to 39.00
Electric furnace bundles	68.00 to 69.00
Elec. furnace, 3 ft. & under	70.00 to 71.00
Structural and plate, 2 ft.	99.00 to 100.00
Structural and plate, 4 ft.	99.00 to 100.00
No. 1 RR hvy. melting	85.00 to 86.00
Scrap rails, random lgth.	103.00 to 104.00
Rails, 2 ft. and under	86.00 to 87.00
Angles and splice bars	86.00 to 87.00
No. 1 cupola cast	67.00 to 68.00
Unstripped motor blocks	67.00 to 68.00

Cincinnati

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 51.00 to \$ 52.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 dealer bundles	63.00 to 64.00
No. 2 bundles	27.00 to 28.00
Machine shop turn	4.00 to 5.00
Shoveling turnings	6.00 to 7.00
Cast iron borings	17.00 to 18.00
Low phos. 18 in. and under	85.00 to 86.00
Rails, random length	66.00 to 67.00
Rails, 2 ft. and under	80.00 to 81.00
No. 1 cupola cast	57.00 to 58.00
Heavy breakable cast	26.00 to 27.00
Drop broken cast	78.00 to 79.00

New York

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 48.00 to \$ 50.00
No. 2 hvy. melting	39.00 to 41.00
No. 2 dealer bundles	23.00 to 27.00
Mixed bor. and turn.	11.00 to 13.00
Machine shop turn	8.00 to 7.00
Shoveling turnings	14.00 to 15.00
Clean cast. chem. borings	35.00 to 36.00
No. 1 machinery cast	89.00 to 90.00
Mixed yard cast	50.00 to 51.00
Heavy breakable cast	10.00 to 12.00
Stainless	
18-8 prepared solids	490.00 to 510.00
18-8 turnings	390.00 to 410.00
430 prepared solids	90.00 to 110.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 60.00 to \$ 62.00
No. 2 hvy. melting	50.00 to 52.00
No. 1 dealer bundles	60.00 to 62.00
No. 2 bundles	67.00 to 69.00
No. 1 busheling	67.00 to 69.00
Shredder scrap	12.00 to 14.00
Machine shop turn	20.00 to 22.00
Shoveling turnings	81.00 to 86.00
No. 1 machinery cast	46.00 to 50.00
Mixed cupola cast	8.00 to 10.00
Heavy breakable cast	8.00 to 10.00

San Francisco

No. 1 hvy. melting	\$ 44.00 to \$ 46.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 dealer bundles	35.00 to 37.00
No. 2 dealer bundles	18.00 to 20.00
Machine shop turn	6.00 to 8.00
Cast iron borings	6.00 to 8.00
No. 1 cupola cast	81.00 to 83.00

Los Angeles

No. 1 hvy. melting	\$ 45.00 to \$ 47.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 dealer bundles	36.00 to 38.00
No. 2 dealer bundles	18.00 to 20.00
Machine shop turn	12.00 to 14.00
Shoveling turnings	8.00 to 10.00
Cast iron borings	6.00 to 8.00
Elec. furnace, 1 ft. and under (foundry)	74.00 to 78.00
No. 1 cupola cast	75.00 to 77.00

Seattle

No. 1 hvy. melting	\$ 68.00 to \$ 70.00
No. 2 hvy. melting	57.00 to 59.00
No. 1 dealer bundles	40.00 to 42.00
No. 2 bundles	62.00 to 63.00
Mixed yard cast	82.00 to 84.00

Hamilton, Ont.

Brokers buying price per net ton on cars:	
No. 1 heavy melting	\$ 91.00
No. 2 heavy melting cut 2 ft. and under	87.00
No. 1 dealer bundles	92.00
No. 2 bundles	53.00
Mixed steel scrap	62.00
Bush. new fact. prep'd	93.00
Bush. new fact. unprep'd	36.00
Machine shop turn	36.00
Short steel turn	30.00
Mixed bor. and turn.	30.00
Cast scrap	79.00

Houston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 68.00 to \$ 70.00
No. 2 hvy. melting	56.00 to 57.00
No. 2 bundles	42.00 to 43.00
Machine shop turn	13.00 to 14.00
Crushed turnings	31.00 to 32.00
Shredder scrap	73.00 to 74.00
Cut structural plate, 2 ft. and under	99.00 to 101.00
Cut structural plate, 6 ft. and under	83.00 to 85.00
Unstripped motor blocks	80.00 to 81.00
Cupola cast	77.00 to 79.00

PRODUCER KEY With Principal Offices

A4 American Cladmetals Co., Carnegie, Pa.
A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C1 Calstrip Corp., Los Angeles
C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C11 Crucible Divisions, Colt Industries, Pittsburgh, Pa.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.
C21 Cumberland Steel Co., Cumberland, Md.

D1 Detroit Strip Div., Cyclops Corp.
D2 Driver Wilber B. Co., Newark, N. J.
D3 Driver Harris Co., Harrison, N. J.

E3 Enamel Products & Plating Co., McKeesport, Pa.
E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, O.
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.
G8 Guterl Special Steel Corp.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., New Castle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Inertake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judeon Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.

M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelson Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minnesota

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P9 Pacific States Steel Co., Niles, Cal.
P14 Pacific Tube Co., Los Angeles
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Robin Steel Corp., Inc., North Tonawanda, N. Y.
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.

S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.
S18 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, O.
T5 Timken Company, Steel Division, Canton, O.
T7 Texas Steel Co., Ft. Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Toleadyne Columbia-Sumnerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit, Mich.

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
City Delivery Charge	Hot-Rolled (10 gauge)	Cold-Rolled (20 gauge)	Galvanized (16 gauge)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	29.65	33.55	34.48	31.63	27.02	23.28	19.55	31.25	34.34	50.60	69.58	73.19
Baltimore	26.90	30.72	37.59	39.82	34.75	26.80	22.60	36.40	51.69	57.95	63.80	69.98
Birmingham	26.60	32.82	34.59	31.64	26.64	23.01	19.99	30.91	49.31	58.90	68.10	74.43
Boston	34.94	40.19	45.64	47.54	33.25	30.06	23.59	40.29	47.92	51.02	58.48	63.50
Buffalo	31.10	35.68	41.89	40.15	30.60	26.15	19.86	36.70	44.15	47.85	53.92	59.84
Chicago	26.48	34.62	37.60	32.74	22.40	22.00	17.70	30.30	38.02	41.09	46.52	52.75
Cincinnati	29.60	34.58	37.16	30.85	23.14	20.75	17.96	32.96	37.16	42.54	46.63	52.44
Cleveland	26.48	34.22	37.48	36.74	23.60	25.56	18.60	36.35	38.19	44.50	47.48	53.93
Denver	31.44	38.19	36.22	36.36	27.40	25.80	20.10	43.00	50.55	57.95	65.95	70.19
Detroit	29.21	35.20	37.87	31.39	23.13	23.86	16.96	32.71	37.18	42.51	46.81	53.49
Houston	27.67	28.71	31.69	39.21	26.73	27.73	22.60	40.15	45.96	52.87	58.95	68.14
Kansas City	30.72	36.05	38.70	34.01	27.10	22.95	17.90	33.12	39.80	45.40	49.73	54.87
Los Angeles	27.01	31.33	37.84	35.32	29.83	33.12	26.52	39.40	50.88	57.10	63.15	70.84
Memphis	26.37	32.51	35.34	33.57	27.75	26.63	21.40	33.87	36.78	49.96	59.80	66.44
Milwaukee	29.35	34.89	37.85	33.06	22.82	24.18	17.58	30.89	36.59	41.65	45.66	52.60
New York	32.47	38.99	42.55	43.38	32.66	25.31	21.06	40.05	40.80	48.40	51.84	55.34
Philadelphia	28.10	38.99	41.23	43.50	31.05	28.11	18.99	36.44	45.80	50.25	60.22	65.42
Pittsburgh	35.27	40.97	45.23	43.45	37.60	30.44	21.29	28.74	38.43	44.64	49.90	54.10
Portland	26.96	32.08	38.73	36.93	32.86	34.78	27.87	44.85	49.78	57.74	70.44	.....
San Francisco	26.94	31.55	36.80	35.58	28.61	31.19	25.78	39.72	50.70	57.69	63.90	70.06
Seattle	23.61	30.12	36.85	32.95	22.02	27.32	25.81	36.14	53.03	61.76	69.75	74.63
Spokane	21.21	30.42	35.85	38.02	35.00	33.77	21.97	43.01	43.20	47.52	.....	58.32
St. Louis	29.11	34.60	37.31	34.59	23.89	22.90	18.15	33.87	38.12	43.51	47.86	53.89
St. Paul	28.87	33.61	36.89	38.36	23.61	23.73	17.70	33.96	37.52	42.72	47.09	53.31

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—15 ga x 36—120; Hot-rolled strip—1/2" x 1"; Plate 1/2" x 84; Shapes—1 Beams 6 x 12.5; Hot-rolled bar—Rounds 1/2"-1 1/2"; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8020—1 1/2" round; Cold drawn—1" round; Hot-rolled 4140—1 1/2" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

Codes identify Producers listed in the Key on page 88. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)	
Carbon Re-rolling, Midwest	
W5	\$366.00
N4	\$366.00
West	
C6	\$346.00
Carbon Forging, East	
B3(2), C10, U1	\$473.00
R3	\$453.00
Midwest	
R3, W5	\$453.00
S1, U1, I3	\$473.00
C10	\$473.00
K2	\$453.00
West	
B3(2)	\$463.00
C6	\$453.00
Alloy, East	
R3	\$492.00
B3, U1, C10	\$512.00
Midwest	
W5	\$492.00
U1, C10, I3	\$512.00
R3	\$492.00
S1	\$512.00
West	
B3	\$502.00
C6	\$469.00

Piling Sheet Steel

(cents per lb)	
Midwest	
U1	26.45

Structurals

Carbon, East	
B3	22.90
U1, J3	23.90
Midwest	
C20	22.90
W8	22.90
I3, T10, U1, N4	23.90
West	
C6	25.10
B3(2)	21.65
South	
C16, U1	23.90
T10	22.90
A8	Cmp*
High-Strength, Low Alloy, East	
B3	22.90
U1, J3	23.90
Midwest	
N4	23.90
W8	24.15
U1	23.90
I3	23.90
West	
B3	21.65
South	
U1, C16	23.90
Wide Flange, Carbon, East	
B3	22.90
U1, J3	23.90
Midwest	
U1	23.90
N4	23.90
I3	23.90
West	
C6	24.15

Strip

Hot-Rolled, Carbon, Cut II	
Edge—all widths, East	
U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3, D1, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1, A7	23.75
U1, B3, I3	23.75
M2, R3	22.05
West	
B3	26.55
South	
R3	22.05

Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
S10	29.60
P15	24.80
B4	36.60
G6	36.175
Midwest	
I4	36.30
W14	32.80
J4	34.05
S1	37.05

High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)*

Midwest	
M2, R3, W3, J3, I3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05

High-Strength, Cold-Rolled, Low Alloy, Mill Edge

Midwest	
S1	37.05
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	26.10
I4	25.20
Alloy, Cold-Rolled, East	
C11, E4, M8	43.35
B4	47.25
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets**Hot-Rolled, Carbon (18 Gs & Hvyr), East**

B3	23.75
J3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5, S1, B3, I3, A7	23.75
West	
U1	24.25
South	
R3	22.05

Cold-Rolled, East, Class I

B3(2)	26.15
J3	26.15
U1	26.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.65
I4	22.00
J3	26.15
D1	26.15
U1, W5, S1, B3, I3, A7	26.15
West	
U1	26.65
South	
R3	24.65

Galvanized (hot-dipped), East

B3(2)	30.30
U1	30.30
Midwest	
J3, D1, W3	28.00
R3, Y1	28.00
G2, M11	30.00
U1, W5, S1, I3, A7	30.30
West	
U1	30.80
South	
R3	28.00

Enameling, Midwest

U1, S1, I3, A7	29.65
J3	27.65
Long-Term, Midwest	
W5, A7	31.65
U1	31.65
R3	29.35

Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00

West	
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
East	
J3	per base box \$28.25
U1	\$27.74
B3	\$27.54
Midwest	
U1	\$27.74
J3	26.29
M11	27.24
W3	26.29
W5	27.74
West	
U1	\$28.24
South	
U1	\$27.74
Double Reduced (55 lb)*	
Midwest	
M11	\$21.87
J3	21.49
U1	22.37
W3	21.49
W5	22.37
West	
U1	\$22.67
South	
U1	\$22.37

Black Plate

Single Reduced (75 lb)*	
East	
B3	\$24.31
Midwest	
J3, W5	\$24.01
I3, W5	24.57
W3	24.01
U1, M11	25.26
West	
U1	\$25.26
Double Reduced (55 lb)	
East	
B3	\$20.49
Midwest	
M11	19.70
W5	18.93
J3	18.93
W3	18.93
W5	18.93
U1	19.70
West	
U1	\$19.70
South	
U1	\$19.70
*70 lb—base weight extra 45¢	
*50 lb—base weight extra \$1.40	

Bars

Carbon Steel, Hot-Rolled*	
(Special quality)	
East	
R3, K3	25.80
R5	25.80
J3	25.80
U1, C10, B3(3)	27.06
Midwest	
I4	23.95
U1, I3	27.05
R3, T10, C20, N4	25.80
K2	25.80
I3	22.00*
A7	20.25
West	
B3	25.80
C6	24.45
South	
A8	20.65
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
C21	21.15
J3(4), L2	31.00
M8, W10, T11, S6	31.00
N1	24.475
R4	33.25
B4	33.25
C10	31.00
Midwest	
W10, R3, M9	33.25
J3	31.00
B1	33.45
L2	30.75
N9	31.00
W14	22.20
B5	34.75

West	
R3	37.15
South	
J3	34.00
C16	24.40
J3	31.95

Alloy, Hot-Rolled, East

R5, K3	27.95
R3, J3	27.95
U1, B3(2), C10	29.20
Midwest	
R3	27.95
I3, C10, U1	29.20
I4	26.10
I3	23.50*
A7	20.25
West	
B3	27.95
C6	26.60
South	
A8	22.00

Alloy, Cold Drawn, East

L2	35.20
R3, N1	37.90
R4	37.10
A11	30.50
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
Midwest	
R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
L2	34.85
B5	38.60
M9	37.10
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3	23.25
L4, U1	25.75
P2	25.75
J3	26.75
Midwest	
B3	23.25
I3	25.75
J3, A7	22.60
U1, I4, S1	25.75
R3	26.75
West	
C6	24.25
U1, B3	25.75
O2	23.00
South	
R3	25.75
U1	25.75
Alloy, East	
B3	31.05
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	31.05
G2, G3	33.55
I4, U1	33.55
West	
B3	33.55
O2	31.00
South	
U1	33.55

Wire

Carbon Steel Wire, East	
B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

DURABLE ORDERS POST SECOND MONTHLY DECLINE

Unquestionably the pace of the growth in the economy is slowing. New orders for manufactured goods fell for the second consecutive month after alternating down-up, down-up from April through July.

Overall, orders for manufacturers dropped 1.8 pct to \$189.0 billion, \$3.6 billion less than August.

September new orders for durable goods alone dropped 4.1 pct to \$98.1 billion compared with \$102.2 billion in August.

Capital goods orders in non-defense industries in September rose after dropping in August, while the defense industries segment was down after being up in the previous month. In the latter category, defense industries orders dropped almost 17 pct to \$6.5 billion compared with \$7.6 billion the previous month. Non-defense capital goods orders, a key indicator of business investment, rose 4 pct to \$27.6 billion versus August's \$26.5 billion.

In metalworking, machine tools total orders in September rose dramatically after a precipitous drop the previous month. Orders rose 42 pct to \$286.3 million compared with August's \$201.0 million. Within that category metalforming tools orders dropped slightly—2.5 pct—while metalcutting orders rose 64.6 pct. In dollar terms, metalforming orders in the ninth month came to \$64.0 million and metalcutting totaled \$222.2 million.

Primary metals orders, after being stable for July and August, dropped almost 11 pct in September to \$10.1 billion.

The biggest drop in durable orders—15.5 pct—was registered by the transportation equipment. Those orders were unchanged in August compared with July.

Of the 26 categories shown, 16 declined, seven were up and three were unchanged.

Billions of Dollars, Seasonally adjusted
Monthly Total, unless otherwise noted
Source: U.S. Dept. of Commerce

	Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)			
U.S. Industry, Total	3rd Qtr. *\$316.2	\$303.8	\$270.0
Manufacturing, Total	3rd Qtr. *135.3	126.0	111.1
Manufacturing, Durable Goods	3rd Qtr. *64.8	58.3	53.1
Mining Industry	3rd Qtr. *13.2	13.3	11.9
KEY INDICATORS, Durable Goods Manufacturing			
New Orders	Sept. 98.1	102.2	90.3
Shipments	Sept. 98.7	101.1	91.5
Inventories	Sept. 188.7	187.2	171.3
Unfilled Orders	Sept. 348.5	349.2	311.7
NEW ORDERS, METALWORKING			
Capital Goods Producers, Nondefense Industries	Sept. 27.6	26.5	25.2
Capital Goods Producers, Defense Industries	Sept. 6.5	7.6	4.8
Primary Metals, Total	Sept. 10.1	11.2	10.9
Steel (SIC 331)	Sept. 4.0	4.7	4.8
Iron & Steel Castings (SIC 332)	Sept. 1.2	1.3	1.3
Nonferrous Metals	Sept. 4.9	5.2	4.8
Nonelectrical Mach.-Equip. Industries, Total	Sept. 17.9	16.1	17.2
Engines & Turbines	Sept. 1.3	1.3	0.8
Farm Machinery & Equipment (Shipments)	Sept. 0.9	0.7	0.9
Construction, Mining & Mat. Hdlg. Equip	Sept. 2.9	2.4	2.6
General Industrial Machinery	Sept. 1.4	1.5	1.3
Fluid Power Equipment** (Index-1972=100)	Sept. 248.0	281.0	276.0
Metalworking Machinery	Sept. 1.1	0.9	0.7
Machine Tools, Total (\$Mill., Unadjusted)***	Sept. 286.3	201.0	156.0
Machine Tools, Metalcutting***	Sept. 222.2	135.0	102.6
Machine Tools, Metalforming***	Sept. 64.0	65.6	53.3
Electrical Mach. & Equip. Industries, Total	Sept. 16.7	16.5	14.3
Elec. Transmission Equip. & Ind. Apparatus	Sept. 2.0	2.1	2.1
Household Appliances	Sept. 1.4	1.4	1.3
Communication Equipment	Sept. 5.9	6.1	4.3
Transportation Equip. Industrial, Total	Sept. 21.9	25.3	19.3
Motor Vehicles & Parts (Shipments)	Sept. 14.9	17.4	13.4
Aircraft, Missiles & Parts	Sept. 6.6	7.1	5.7
Shipbuilding & Military Tanks	Sept. 0.2	0.4	0.6
Fabricated Metal Products, Total	Sept. 11.9	12.0	10.5
Instruments, Total	Sept. 4.9	4.9	4.2

*Est.—Commerce Dept. **Source: National Fluid Power Assn. ***Source: NMTA

CHILTON'S

IRON AGE

C2150-8

December 17, 1984



**PERSONAL COMPUTERS
ARRIVE ON THE FACTORY FLOOR**

Paul Conrad/Los Angeles Times

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**IRON AGE'S
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BUSINESS HUMOR**

CHILTON'S IRON AGE

MANUFACTURING MANAGEMENT



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ONE OF THE **ADP PUBLISHING** COMPANIES



PRICE & PRODUCTION DATA

(Effective December 3, 1984)

Steel production by districts, thousands of tons*

(000 omitted)	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	158	178	128	194
Pittsburgh	175	161	182	227
Youngstown	83	60	89	89
Lake Erie	115	115	127	141
Detroit	124	144	130	136
Chicago	399	418	412	516
Cincinnati	91	90	81	90
St. Louis	77	67	72	73
Southern	168	168	164	159
Western	66	62	67	76
U.S. Production	1,456	1,463	1,452	1,710

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton	80.50-86.9*
Mesabi, regular-unscreened	gross-ton	\$32.53
Mesabi, non-bessemer	gross-ton	\$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81

66.9¢—U.S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82. and Hanna Mining as of 2/26/82

**Effective 8/1/83.

NONFERROUS PRICES

(Effective December 3, 1984) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	51.09	51.80	12/3/84
Copper (C)	63.00	62.50	
	66.00	66.00	12/3/84
Lead	26.00	26.00	
	28.00		11/13/84
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	214.19	213.59	12/3/84
Titanium Sponge	555.00	555.00	
	585.00		4/29/82
Zinc	45.00	45.00	
		48.00	9/21/84

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. Canada ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$140.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.55
Calcium, ton lots, crown	\$3.58
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$329.50
Indium, dollars per troy oz.	\$310.3-330
Iridium, dollars per troy oz.	\$450.00
Magnesium sticks, 10,000 lbs.	\$1.97
Mercury, per 76-lb. f.o.b. N.Y.	\$315.00-328.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective December 3, 1984)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1984	To Date 1983
Net tons, in thousands	1,456	1,463	85,333	75,827
Capability Utilization Rate	56.2	56.5	68.7	54.7

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	26.822
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$78.50	\$78.50	\$79.50	\$86.17
No. 2 bundles	\$50.50	\$51.17	\$50.83	\$54.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$79.50	\$79.50	\$81.50	\$90.50
No. 1 steel, Philadelphia	75.50	75.50	76.50	83.50
No. 1 steel, Chicago	80.50	80.50	80.50	84.50
No. 1 bundles, Detroit	61.50	64.50	64.50	86.50
Low Phos., Youngstown	72.50	72.50	72.50	88.50
No. 1 mach'y cast., Pgh	66.50	66.50	66.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	97.50
No. 1 mach'y cast., Chi	110.50	110.50	110.50	111.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$143.00
Platinum, per troy oz.	\$320.00
Rhodium, per troy oz.	\$815.00
Silver ingots, per troy oz.	\$7.475
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Nov. 26—\$48.73	Nov. 29—\$48.73
Nov. 27—\$48.99	Nov. 30—\$48.46
Nov. 28—\$49.12	

Scrap Prices Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turning
Copper	60½	50¼
Yellow brass	54½	50
Red brass	56¾	50½
Comm. bronze	57¼	51
Mang. bronze	57¾	47¼
Free cutting rod ends	51	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	46
Light copper	37

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	51
No. 2 copper wire	42
Light copper	33
No. 1 composition	46
No. 1 comp. turnings	43
Hvy. yellow brass solids	35
Hvy. yellow brass turnings	31
Radiators	37

Aluminum		
New mixed clips	35	— 36
Old sheet	33	— 34
Old cast	33	— 34
Clean dry borings	33	— 34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	27	— 29
Mixed L.C. clips	24	— 26
Old sheets and cast	22	— 23
Borings and turnings	18	— 20
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	42	— 43
No. 2 copper wire	34	— 35
Light copper	29	— 30
Radiators	31	— 32
No. 1 composition	40	— 41
No. 1 composition turnings	37	— 38
Cocks and faucets	27	— 28
Clean heavy yellow brass	28	— 29
Brass Pipe	29	— 30
New soft brass clippings	41	— 42

Lead

Heavy soft lead	9	— 10
Whole batteries	3	— 4
Type metal	16	— 17
Electrotype	13	— 14

Nickel

Nickel solids	115	— 120
Nickel rod ends	115	— 120
Nickel sheets/clips	115	— 120
Nickel turnings	40	— 45

Zinc

New zinc clippings	18	— 19
Old diecast zinc	14	— 15

EFFECTIVE DECEMBER 3, 1984

(Effective December 3, 1984) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 79.00 to \$ 80.00
No. 2 hvy. melting	71.00 to 72.00
No. 1 dealer bundles	89.00 to 90.00
No. 1 factory bundles (auto)	89.00 to 90.00
No. 2 bundles	50.00 to 51.00
No. 1 busheling	89.00 to 90.00
Machine shop turnings	10.00 to 11.00
Shoveling turnings	51.00 to 52.00
Cast iron borings	49.00 to 50.00
Low phos. punchings plate	99.00 to 100.00
Heavy turnings	71.00 to 72.00
No. 1 RR hvy. melting	87.00 to 88.00
Rails, 2 ft. and under	103.00 to 104.00
Scrap rails, random lgth	93.00 to 94.00
RR specialties	87.00 to 88.00
No. 1 machinery cast	66.00 to 67.00
Cupola cast	59.00 to 60.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	570.00 to 580.00
18-8 turnings	470.00 to 480.00

Chicago

No. 1 hvy. melting	\$ 80.00 to \$ 81.00
No. 2 hvy. melting	75.00 to 76.00
No. 1 dealer bundles	89.00 to 90.00
No. 1 factory bundles (auto)	87.00 to 88.00
No. 2 dealer bundles	54.00 to 55.00
No. 1 busheling	87.00 to 88.00
Shredder scrap	89.00 to 90.00
Machine shop turnings	43.00 to 44.00
Mixed borings and turnings	44.00 to 45.00
Shoveling turnings	48.00 to 49.00
Cast iron borings	48.00 to 49.00
Low phos. large scrap	114.00 to 115.00
Low phos. punchings plate	
1/4 in. and heavier	124.00 to 125.00
Low phos. 2 ft. and under	119.00 to 120.00
No. 1 RR hvy. melting	86.00 to 87.00
Scrap rails random lgth	88.00 to 89.00
Roller rails	99.00 to 100.00
Rails, 2 ft. and under	113.00 to 114.00
RR couplers and knuckles	90.00 to 91.00
RR car axles	123.00 to 124.00
No. 1 machinery cast	110.00 to 111.00
Cupola cast	99.00 to 100.00
Stove plate	94.00 to 95.00
Steel car wheels	100.00 to 101.00
Stainless	
18-8 bundles and solids	490.00 to 500.00
18-8 turnings	420.00 to 430.00
430 bundles and solids	120.00 to 125.00
430 turnings	80.00 to 90.00

Philadelphia

No. 1 hvy. melting	\$ 74.00 to \$ 77.00
No. 2 hvy. melting	66.00 to 69.00
No. 1 dealer bundles	87.00 to 90.00
No. 2 dealer bundles	45.00 to 48.00
No. 1 busheling	87.00 to 90.00
Shredder scrap	94.00 to 97.00
Machine shop turnings	29.00 to 32.00
Mixed borings and turnings	29.00 to 32.00
Shoveling turnings	38.00 to 41.00
Low phos. 5 ft. and under	84.00 to 87.00
Low phos. 2 ft. punchings	110.00 to 113.00
Electric furnace bundles	95.00 to 98.00
RR specialties	87.00 to 90.00
Rails, 2 ft. and under	112.00 to 115.00
Cupola cast	76.00 to 79.00
Heavy breakable cast	57.00 to 60.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 50.00 to \$ 51.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 dealer bundles	61.00 to 62.00
No. 2 bundles	31.00 to 32.00
No. 1 busheling	60.00 to 61.00
Drop large flashings	36.00 to 39.00
Machine shop turnings	44.00 to 45.00
Mixed borings and turnings	21.00 to 22.00
Shoveling turnings	45.00 to 46.00
Cast iron borings	31.00 to 32.00
Heavy breakable cast	40.00 to 41.00
Mixed cupola cast	56.00 to 57.00
Automobile cast	80.00 to 81.00
Stainless	
18-8 bundles and solids	445.00 to 455.00
18-8 turnings	350.00 to 360.00
430 bundles and solids	105.00 to 115.00

Youngstown

No. 1 hvy. melting	\$ 59.00 to \$ 62.00
No. 2 hvy. melting	42.00 to 45.00
No. 1 dealer bundles	71.00 to 72.00
No. 2 dealer bundles	35.00 to 38.00
Machine shop turnings	11.00 to 14.00
Shoveling turnings	16.00 to 19.00
Low phos. plate	71.00 to 74.00
Electric furnace bundles	69.00 to 72.00
Galvanized bundles	59.00 to 62.00

Cleveland

No. 1 hvy. melting	\$ 50.00 to \$ 53.00
No. 2 hvy. melting	34.00 to 37.00
No. 1 dealer bundles	62.00 to 65.00
No. 2 dealer bundles	71.00 to 74.00
No. 1 busheling	19.00 to 22.00
Machine shop turnings	64.00 to 67.00
Mixed borings and turnings	6.00 to 9.00
Shoveling turnings	6.00 to 9.00
Cast iron borings	7.00 to 10.00
Cut structural & plates, 2 ft. and under	10.00 to 13.00
Low phos. punchings plate	100.00 to 103.00
Drop large flashings	100.00 to 103.00
Foundry steel, 2 ft. and under	35.00 to 38.00
No. 1 RR hvy. melting	57.00 to 60.00
Rails, 2 ft. and under	73.00 to 76.00
Rails, 18 in. and under	105.00 to 108.00
Steel axle turnings	104.00 to 109.00
Railroad cast	58.00 to 59.00
No. 1 machinery cast	89.00 to 91.00
Cupola cast	99.00 to 101.00
Stove plate	55.00 to 58.00
Stainless	41.00 to 44.00
18-8 bundles	375.00 to 385.00
18-8 turnings	325.00 to 335.00
430 bundles	80.00 to 85.00

Buffalo

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 62.00 to \$ 63.00
No. 2 hvy. melting	51.00 to 52.00
No. 1 busheling	72.00 to 73.00
No. 1 dealer bundles	71.00 to 72.00
No. 2 bundles	36.00 to 37.00
Machine shop turnings	11.00 to 12.00
Mixed borings and turnings	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Cast iron borings	20.00 to 21.00
Low phos. plate	92.00 to 93.00
Structural and plate, 2 ft. and under	95.00 to 96.00
Rails, 2 ft. and under	95.00 to 96.00
Scrap rails, random lgth	72.00 to 73.00
No. 1 machinery cast	78.00 to 79.00
No. 1 cupola cast	58.00 to 59.00

St. Louis

No. 1 hvy. melting	\$ 58.00 to \$ 59.00
No. 2 hvy. melting	47.00 to 48.00
Foundry steel, 2 ft.	58.00 to 59.00
No. 1 dealer bundles	58.00 to 59.00
No. 2 bundles	47.00 to 48.00
Machine shop turnings	17.00 to 18.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	27.00 to 28.00
No. 1 RR hvy. melting	58.00 to 59.00
Rails random length	65.00 to 66.00
Rails, 18 in. and under	83.00 to 84.00
RR specialties	80.00 to 81.00
Cupola cast	72.00 to 73.00
Heavy breakable cast	50.00 to 51.00
Stove plate	83.00 to 84.00
Steel car wheels	94.00 to 95.00
Rolling rails	78.00 to 79.00
Unstripped motor blocks	61.00 to 62.00

Birmingham

No. 1 hvy. melting	\$ 68.00 to \$ 69.00
No. 2 hvy. melting	63.00 to 64.00
No. 1 dealer bundles	69.00 to 70.00
No. 2 bundles	45.00 to 46.00
No. 1 busheling	69.00 to 70.00
Shredder scrap	94.00 to 95.00
Machine shop turnings	23.00 to 24.00
Shoveling turnings	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Electric furnace bundles	67.00 to 68.00
Elec. furnace, 3 ft. and under	68.00 to 69.00
Structural and plate, 2 ft.	97.00 to 98.00
Structural and plate, 4 ft.	89.00 to 90.00
No. 1 RR hvy. melting	89.00 to 90.00
Scrap rails, random lgth	85.00 to 86.00
Rails, 2 ft. and under	103.00 to 104.00
Angles and splice bars	89.00 to 90.00
No. 1 cupola cast	86.00 to 87.00
Unstripped motor blocks	67.00 to 68.00

Cincinnati

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 49.00 to \$ 50.00
No. 2 hvy. melting	48.00 to 50.00
No. 1 dealer bundles	60.00 to 61.00
No. 2 bundles	24.00 to 25.00
Machine shop turnings	4.00 to 5.00
Shoveling turnings	6.00 to 7.00
Cast iron borings	17.00 to 18.00
Low phos. 18 in. and under	82.00 to 83.00
Rails, random length	64.00 to 65.00
Rails, 2 ft. and under	77.00 to 78.00
No. 1 cupola cast	54.00 to 55.00
Heavy breakable cast	25.00 to 26.00
Drop broken cast	74.00 to 75.00

New York

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 48.00 to \$ 50.00
No. 2 hvy. melting	39.00 to 41.00
No. 2 dealer bundles	23.00 to 27.00
Mixed borings and turnings	11.00 to 13.00
Machine shop turnings	6.00 to 7.00
Shoveling turnings	14.00 to 15.00
Clean cast, chem borings	35.00 to 36.00
No. 1 machinery cast	89.00 to 90.00
Mixed yard cast	50.00 to 51.00
Heavy breakable cast	10.00 to 12.00
Stainless	
18-8 prepared solids	490.00 to 510.00
18-8 turnings	390.00 to 410.00
430 prepared solids	90.00 to 110.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 58.00 to \$ 60.00
No. 2 hvy. melting	48.00 to 50.00
No. 1 dealer bundles	58.00 to 60.00
No. 2 bundles	35.00 to 37.00
No. 1 busheling	65.00 to 67.00
Shredder scrap	65.00 to 67.00
Machine shop turnings	10.00 to 12.00
Shoveling turnings	18.00 to 20.00
No. 1 machinery cast	81.00 to 86.00
Mixed cupola cast	48.00 to 50.00
Heavy breakable cast	8.00 to 10.00

San Francisco

No. 1 hvy. melting	\$ 44.00 to \$ 46.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 dealer bundles	35.00 to 37.00
No. 2 dealer bundles	18.00 to 20.00
Machine shop turnings	6.00 to 8.00
Shoveling turnings	6.00 to 8.00
Cast iron borings	6.00 to 8.00
No. 1 cupola cast	81.00 to 83.00

Los Angeles

No. 1 hvy. melting	\$ 45.00 to \$ 47.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 dealer bundles	36.00 to 38.00
No. 2 dealer bundles	18.00 to 20.00
Machine shop turnings	12.00 to 14.00
Shoveling turnings	8.00 to 10.00
Cast iron borings	6.00 to 8.00
Elec. furnace, 1 ft. and under (foundry)	74.00 to 76.00
No. 1 cupola cast	75.00 to 77.00

Seattle

No. 1 hvy. melting	68.00 to 70.00
No. 2 hvy. melting	57.00 to 59.00
No. 2 bundles	40.00 to 42.00
No. 1 cupola cast	92.00 to 93.00
Mixed yard cast	82.00 to 84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 87.00
No. 2 hvy. melting, cut 2 ft. and under	81.00
No. 1 dealer bundles	88.00
No. 2 bundles	60.00
Mixed steel scrap	62.00
Bush new fact. prep'd	89.00
Bush new fact. unprep'd	79.00
Machine shop turnings	36.00
Short steel turnings	38.00
Mixed borings and turnings	30.00
Cast scrap	79.00

Houston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 69.00 to \$ 70.00
No. 2 hvy. melting	56.00 to 57.00
No. 2 bundles	42.00 to 43.00
Machine shop turnings	12.00 to 13.00
Crushed turnings	29.00 to 31.00
Shredder scrap	73.00 to 74.00
Cut structural plate, 2 ft. and under	99.00 to 101.00
Cut structural plate, 5 ft. and under	83.00 to 85.00
Unstripped motor blocks	60.00 to 61.00
Cupola cast	77.00 to 78.00

LOWER AUTO COSTS KEEP A LID ON PRODUCER PRICES

Producer prices in October dropped for the third consecutive month indicating a continued deceleration of inflation and an apparent slowing of economic growth.

The U.S. Bureau of Labor Statistics reported the October drop was 0.2 pct, the same as September. And the September drop had been the biggest in 21 months. Three consecutive months of declines—August through October—is the longest string of drops in 17 years.

The October drop was largely attributable to the seasonally adjusted decline in prices of cars and trucks because increased costs of new 1985 models—traditionally introduced in the fall—were lower than normal. Unadjusted prices for autos—shown at right—rose 5.5 pct.

Among finished consumer goods other than foods and energy, prices were down 0.5 pct. Capital equipment prices dropped 0.6 pct, after registering unchanged in September. That category represents 22.2 pct of the total producer price index.

For the fourth consecutive month, the index of materials for durable manufacturing declined; the October drop was 0.4 pct. Nonferrous metals led the way. Prices of primary aluminum, tin, lead and zinc fell for the third consecutive month. Copper prices resumed their downward pattern after a brief upturn in September.

Although prices for hot rolled steel sheet and strip advanced following several months of slight upward movements, some other types of steel registered small declines.

For machine tools, both metalcutting and metalforming equipment prices rose in October, 0.8 pct and 0.3 pct respectively.

Overall, of the 23 categories shown, 18 rose, only one was down and four were unchanged compared with September.

Latest Month Covered: October, 1984

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	389.8	+ 0.8	+ 3.5
Metal Forming Machine Tools	427.0	+ 0.3	+ 2.3
Agricultural Machinery & Equip.	338.0	0	+ 3.0
Construction Machinery & Equip.	359.1	0	+ 1.6
Industrial Process Furnace & Ovens	376.5	+ 0.3	+ 2.4
Industrial Material Handling Equip.	291.1	+ 0.2	+ 1.7
Pumps, Compressors & Allied Equip.	350.4	+ 0.2	+ 1.4
Fluid Power Equip. (Dec. 1970 = 100)	261.4	+ 0.2	+ 2.8
Mechanical Power Transmission Equip.	330.5	+ 0.1	+ 4.6
Automobiles	222.6	+ 5.5	+ 0.3
Motor Trucks—Light	289.6	+ 8.1	+ 3.5
Motor Trucks—Heavy	331.1	- 0.1	+ 3.4
Railroad Equipment	364.6	0	+ 4.6
Fabricated Metal Structural Products	314.0	+ 0.6	+ 3.2
Electric Motors	343.1	+ 0.8	+ 2.3
Valves & Fittings (Dec. 1982 = 100)	102.8	0	+ 3.1
Ball & Roller Bearings	345.1	+ 0.3	+ 4.0
Cutting Tools & Accessories	281.7	+ 0.6	+ 2.4
Heating Equipment	258.2	+ 0.3	+ 5.3
Plumbing Fixtures & Brass Fittings	300.6	+ 2.7	+ 0.5
Metal Containers	358.0	+ 1.5	+ 5.8
Miscellaneous Metal Products	297.7	+ 0.7	+ 3.0

Data based on U.S. Labor Dept.'s Producer Price Index

CHILTON'S

January 4, 1985

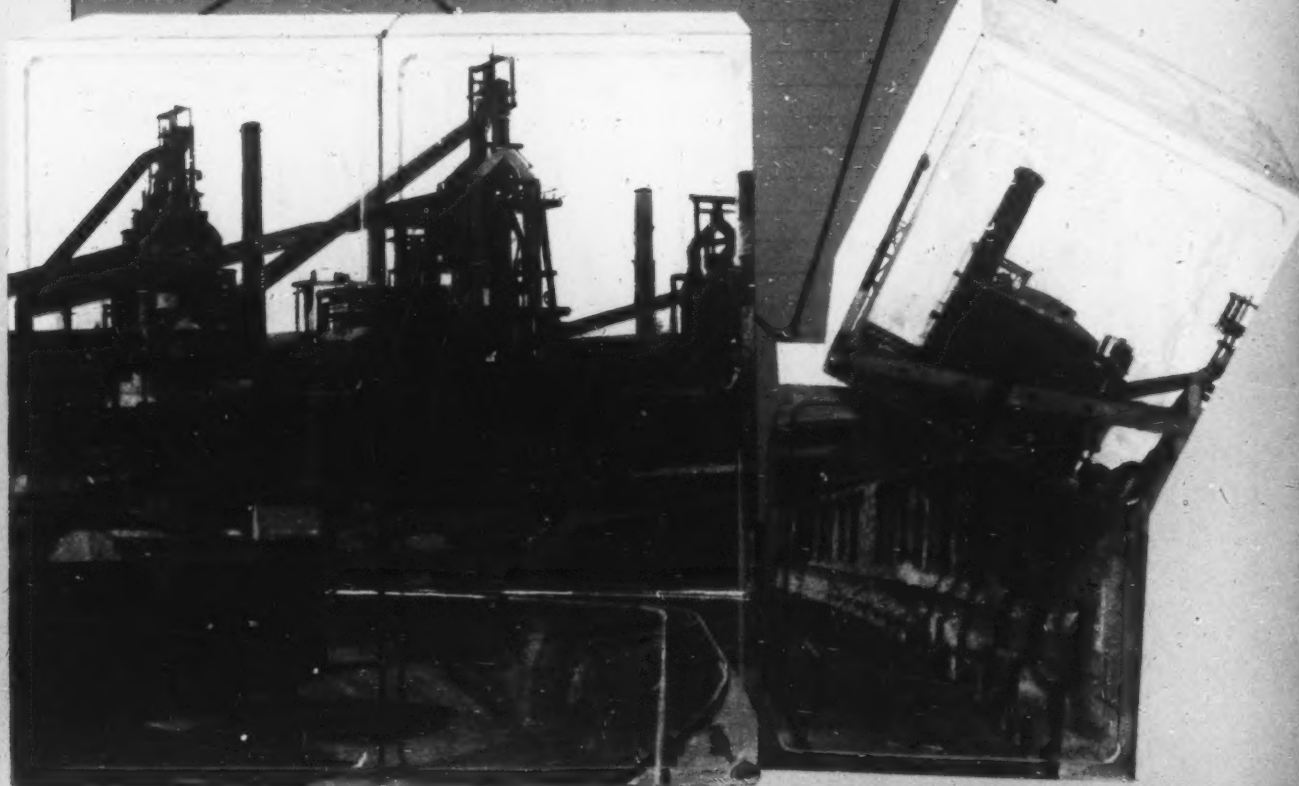
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IRON AGE

MANUFACTURING MANAGEMENT

1985 FORECAST ISSUE

HOW INDUSTRY WILL HOLD UP THIS YEAR
AN EXCLUSIVE LOOK AT 29 INDUSTRIES



PEOPLE AND EVENTS SHAPING THE NEWS—
A REVIEW OF '84 AND A PREVIEW OF '85

EXECUTIVE INSIGHT—TOP EXECS
PREDICT THE LONG-TERM FUTURE
OF MANUFACTURING IN AMERICA

U.S. ANNUAL STATISTICAL REVIEW

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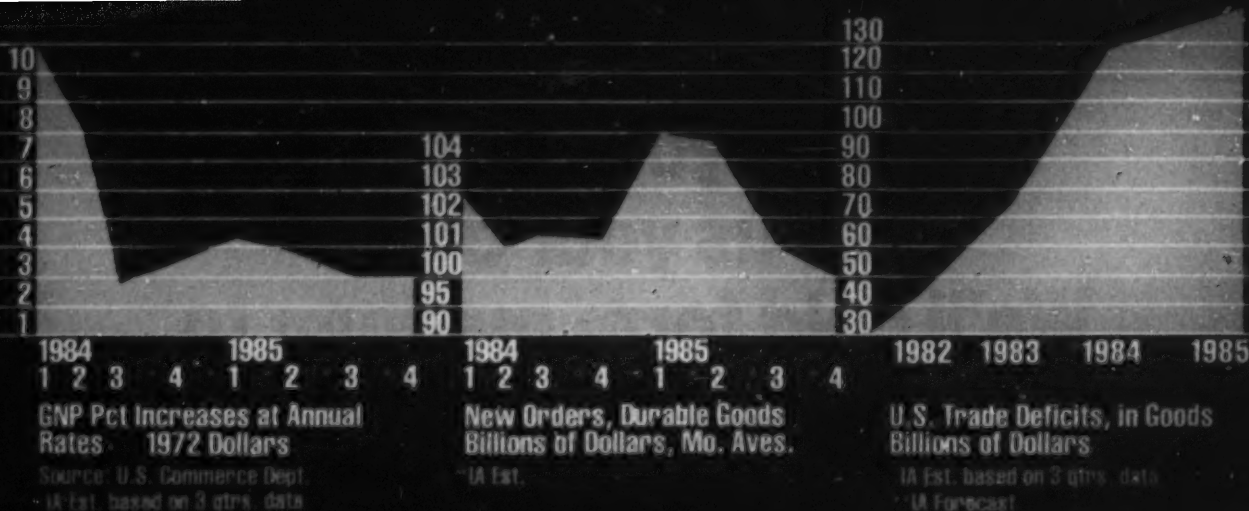
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1985 FORECAST

BY JOHN D. BAXTER

1985?

Forget the Washington brouhaha on dealing with the Federal budget deficit.

Keep your eye on the Fed.

Viewed in that perspective, 1985 looks promising.

There is little that fiscal policy can do to strengthen or weaken the outlook for 1985. The Federal budget for fiscal year 1985 is already set in concrete. That year began on October 1, 1984.

Predictably, fiscal policy will have a dominating influence on the economy in fiscal 1986—and in calendar terms, that means 1986. Then, there will be almost certainly, major tax changes, and possibly some big government spending cuts aimed at the huge budget deficit.

So, let the budget deficit battle between the Hill and the White House roar on. It's significant—but not for calendar year 1985 as far as business managers are concerned.

The Fed, however, does have the power to keep recovery fires burn-

ing through 1985—or to just about extinguish them.

All this means that economic and business recovery this year will reflect, for the most part, two factors: One, what the Fed does about money supply and interest rates, and two, the underlying strength and momentum of the recovery itself.

In sum, they both look promising for 1985.

First, the Fed.

Lately, the Fed has felt a bit triumphant. Back in 1981, it set a tough goal of bringing inflation to its knees. It won the battle. (Certainly, in its own view.) In 1981, the inflation rate, measured by the GNP deflator, was 9.6 pct. In the latest annual measure for 1984, prices moving up at a subdued 3.6 pct rate.

As the year starts, the Fed is in a benign mood. It is a mood that has been termed, "pro-recovery." And the Administration and business couldn't have a better friend when it comes to keeping the good times rolling.

There are several good reasons to believe the central bank will try to

keep that roll going.

For one, as noted, inflation is subdued. That means stimulative policies can be used without fear of stirring the glowing embers of inflation.

Secondly, the economy is moving ahead at a much slower rate than it did earlier in the expansion period. So, the problem has shifted from beating back inflation to preventing the business recovery from slowing to a halt. The Fed lately has shown clear signs of shifting its policy direction to meet the new challenge.

Another reason to believe the Fed will act positively to keep the recovery rolling is the fact that it has been running on the low side of its targeted ranges for money supply.

Lastly, of course, the Fed has elbow room to stir up the economy because interest rates have behaved well lately.

In short then, the nation's central bank is on the side of business expansion. That alone almost assures an upbeat 1985—at least, through the first half.

Favorable government economic policies are always of help. But one



1984 1985
1 2 3 4 1 2 3 4
Plant Spending Billions of Dollars,
Seas. Adj. Annual Rates

IA Forecast
Est. - Commerce Dept.

HOW INDUSTRY WILL HOLD UP THIS YEAR

factor having even greater impact at this stage of a business cycle is the very momentum of the recovery itself. That momentum—despite the recovery's great pause after mid-year 1984—now looks favorable. This is especially true for industrial capital goods lines which usually come on strong in the latter days of a business expansion.

The third quarter slowdown last year shook up a lot of people. But most economists who had made forecasts of recovery rolling right on through most of 1985, stood by their projections. As one said, "It took guts."

The new alignment of sales and inventories could well mean improved growth rates in final sales in the closing quarter of 1984 and the first two quarters this year. This is a view shared by many economists.

One of those economists is Stephen S. Roach, vice president and senior economist of the investment firm Morgan Stanley & Co.

"While current quarter (4th of 1984) GNP growth is likely to be little different than the sluggish third

period report," he said, "the clearing up of inventory problems sets the stage for a resumption of output growth that is driven by the momentum of final demands. As a result, we continue to expect real GNP to be rising at a 4 pct to 5 pct pace in the first half of 1985"

Inventory adjustment helps explain the late 1984 pause in the recovery. But if 1985 is to see a continuance of recovery, there must be solid marketplace demand—in consumer and industrial markets. Too, government buying of goods and services should be strong.

Apparently, consumers are not in a mood to cool their buying. The latest survey findings of the University of Michigan's Institute for Social Research (ISR), issued in mid-November, spells out the good news with a bang.

"Consumer optimism remains near its highest point in a decade," stated ISR analysts, "indicating that peak-level spending should continue through mid-1985."

In the four quarters through the end of the September period—the latest fully measured quarter—personal consumption expenditures rose a total of \$100 billion.

So, it appears that the American consumer will take 1985 in stride. He is set to continue buying at a full recovery pace.

Too, there has been little loss of steam in government buying of goods and services. The hefty budget for military expenditures is a base under this spending as 1985 starts.

So, there is continuing strength in consumer and government buying as 1985 opens. But the late-shining star in 1985 may well be in industrial capital goods demand.

There are two reasons for putting a blue-chip bet on business big-tag spending. First, this was the sector with the best momentum as the year started. Second, much talked-about proposed changes in capital asset write-off rules might well spark some "beat the clock" investment before tougher depreciation rules go on the books.

Any talk about a "slowdown" in business investment in late 1984 makes one wonder about a definition of the term. In terms of percentage growth at annual rates, nonresidential fixed investment increased

by 20.6 pct, 21.3 pct and 8.0 pct in the quarters ending in the September period.

One economist said that is a clear picture of the "pause" in the recovery.

A just-as-clear sign of a resumption of stronger gains in spending on new plant and equipment was seen in The Conference Board's second quarter 1984 capital appropriations survey.

"Led by the motor vehicle industry," said the Board's report, "the nation's 1000 largest manufacturers set a new record for capital appropriations in the second quarter of 1984."

"Those giant firms appropriated \$37.1 billion (seasonally adjusted), for new plant and equipment, a 38 pct jump over the first quarter. It marked the fifth quarterly increase in a row and foreshadows a strong upward trend in capital spending."

Also, corporations will be closely monitoring developments in new tax proposals as the Administration and Congress go at it this year. If talk of cutbacks in depreciation allowances looks to be serious, some companies may speed up their investment plans. It is hard to see with all the momentum going, albeit, the late 1984 slowing of recovery, how 1985 could be a downer. It looks to be a slower, less spectacular growth than in early 1984, but still growth. And that's growth on top of growth.

But, as always in talking about an economic outlook, there are concerns and caveats. These mostly center on the last half of the year.

Interest rates were so high and so damaging for so long that many people live in fear of a replay. Sky-high rates could reappear. That could happen if a revived and lengthening recovery would breed a rising inflation rate.

The big "if" is really centered on the strength of the dollar. If it weakens then most economists say interest rates could soar. The flow of foreign funds to this country would dry up leaving the Fed to finance the budget deficit.

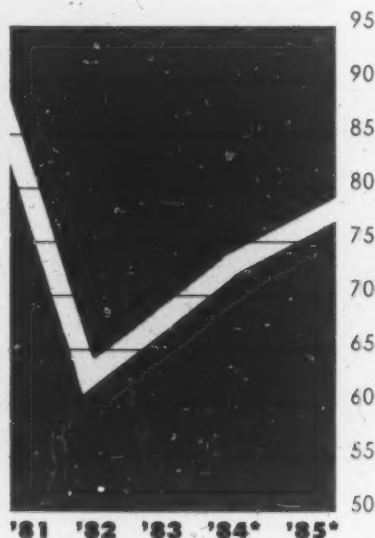
Still, most forecasters,—both economists and business executives—look for a good 1985. Slower growth than in 1984, for sure. And, in sum, it appears they see continuing business expansion through the first half; the last half is veiled. □

STEEL

Steel men now see true demand in the U.S. at 80 million tons per year.

Steel Shipments

Millions of Short Tons



Source: AISI
*IA estimate

In 1985, consumption of steel will remain at 95 or 96 million tons.

Steel imports will drop by 5 or 6 million tons. That amount will be added to the volume of domestic mills, giving shipments of 78 or 79 million tons.

That's the consensus scenario next year. A modest slowing of the consumer market is seen canceling a modest rise in markets tied to capital spending. Consumption will be steady, but reduced imports will provide a lift for U.S. producers.

Steel men were holding to shipping forecasts of around 78 million tons, but going into 1985, they were shipping at an annual rate of about 68 million tons. People were starting to talk about February as the earliest time for an upturn.

It's probably realistic to assume that the steel recovery has gone about as far as it's going to go. In 1982 and to some extent in 1983 and 1984, the depressed state of the steel market could be attributed to the state of the general economy.

In 1985, the general recovery will be three years old. Steel mills should be looking at true, normal demand and not some cyclical aberration. Until it is shown otherwise, steel men have to regard something under 80 million tons as true demand in a pretty good year. That is a far cry from the 111 million tons shipped in 1973 and the 94 million ton average of the 70s. It looks as though there's been permanent shrinkage of at least 14 million tons annually in the steel market.

The question to be answered is whether the steel industry as it's now constituted can survive and prosper with shipments between 70 and 80 million tons. Last year's experience was not encouraging in this regard. After a brief spurt of profitability in the first half, the steel industry began sinking back in the red

in the third quarter. There was no improvement in the fourth quarter.

What killed the mills last year was price cutting. Costs have been slashed over the past two years, but prices have been slashed even more.

One explanation for the price cutting might be that there is still too much domestic capacity. Although 25 million tons of raw steel have been subtracted since the start of 1977, domestic production was running below 60 pct of capacity in the second half of 1984.

It's worth remembering, however, that imports captured more than 26 pct of the market in the first nine months of 1984. In 1977, domestic steel prices collapsed when imports accounted for less than 18 pct of U.S. supply.

Prices collapsed in 1977 even though domestic mills shipped more than 91 million tons and operated at nearly 80 pct of capacity. It appears that when the import share reaches a certain percentage, the imports determine price conditions even in a good year.

In 1985, the steel import share of the U.S. market is supposed to be about 20 pct. That will be high by most past standards, but it will be less than it was in 1985.

Steel producers aren't expecting a return to the days of big, regular price increases; producers feel they will have to rely primarily on cost reduction to generate profits; but it's felt the industry must get away from the condition where prices are always below costs.

Even if they had unlimited discretion, steel companies probably wouldn't go back to the old cost-plus style of pricing. There is growing concern about the indirect displacement of steel by imports of manufactured products. Steel people realize they must help keep their customers cost competitive.

NONFERROUS

The once-peppy business recovery of 1983-84 was slowing to a walk in the latter months of last year, but economic pulse-takers still were unwilling to write 1985 down as a year of slower growth.

Capital appropriations by major manufacturers rose sharply last year—some estimates late last year were as high as 20 pct—and if this is carried over into actual expenditures for plant and equipment, it could provide a sizable lift to the metals companies, particularly the copper, nickel and molybdenum producers.

The aluminum industry was looking for a record shipment year in 1984 and a further, albeit smaller, gain in 1985. While aluminum consumption was up, a large slice of the pie was claimed by imported mill products, including imported can stock, which were nearly double the 1983 rate.

Part of the problem was a weakening of the ingot price on the world market, which held down costs for overseas mill product producers. Primary ingot production came back onstream too fast in the latter part of 1983 and the early months of 1984 and it wasn't until the final months of the year that production curbs started taking hold outside the U.S. (where output started downward at midyear). Ingot prices started improving toward the end of 1984.

Rigid container sheet remained a strong market for aluminum in 1984, but promises to become even more competitive over the next year or so because of capacity build-ups by the established suppliers and new capacity additions as well. Shipments to the transportation and building and construction markets also improved significantly.

Copper prices started showing signs of slow recovery toward the end of 1984, reflecting the contin-

ued downtrend in hedge market stocks and improvement in actual consumption. Imports continued to claim a large share of the U.S. market for both primary copper and for copper and brass mill products.

The U.S. producers lost their bid for protection from imports again in 1984, during which period the major supplier to U.S. consumers was Canada and not Chile, the principal target of the original import quota bid.

There still was a large copper surplus at the end of 1984, but it was quite a bit less than it was at the start of the year. U.S. companies kept a tight rein on production last year, thanks to deep cutbacks and outright closures. To that extent, at least, the U.S. companies were entering the new year in a lot better position than they were at midyear.

Higher auto production helped the zinc companies last year, prompting some to say that the downtrend in per-car use of zinc die castings had bottomed out. Slab zinc shipments were trending upward and smelter stocks downward as the final quarter got under way and, while inventories were larger than they were a year earlier, they still were far from burdensome.

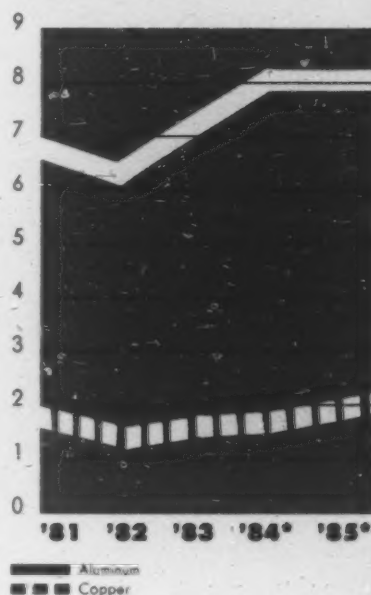
Expectations of a strong capital goods market this year should help the nickel industry, where the emphasis was on getting the inventory down in the opening months of 1985.

London Metal Exchange inventories trended downward last year and nickel use in the non-Communist world hit 1.25 billion lbs in 1984, the best level since the peak 1979 period. Conservative projections for 1985 consumption are lodged at 1.25 billion lbs, even with the 1984 total, which would make the size of the surplus the key to price trends.

Expectations of a strong capital goods market during 1985 should help.

Nonferrous Metals, Shipments

Millions of Short Tons



Source: American Bureau of Metal Statistics, Aluminum Assn.
*1A estimate

AUTOMOTIVE

U.S. automakers likely will sell 7.8 million cars in 1985—100,000 fewer than the estimated 7.9 million they sold in 1984.

Domestic-car production in 1985 should continue to run at full capacity, matching 1984's production figure of 7.9 million units. Since dealer inventory at the end of 1984 was an estimated 55 days' worth of sales, lower than the optimum 60-day supply, the extra production will replenish inventories.

Automakers expect the Japanese to continue their voluntary restraint agreement (V.R.A.) but raise the ceiling by 10 pct, or 200,000 units. The Japanese now ship 1.94 million units into the U.S. Raising Japan's limit on exports should increase total import sales in the U.S. from an estimated 2.4 million in 1984 to 2.6 million in 1985.

The key to the auto industry's sales outlook, auto executives agree, is the federal deficit. If the federal government takes little action to cut the deficit, interest rates will rise, perhaps sharply, they say. That will dramatically cut car sales. But the consensus in Detroit is that Washington will take enough action to keep interest rates fairly flat throughout 1985.

Most auto executives are predicting that the first half of 1985 will see stronger sales than the second half. That's partly because they expect slightly lower interest rates earlier in the year but mostly because they expect a stronger economy during the first half.

"The auto industry is nothing but an economic reflection of consumer confidence," the sales analyst for one automaker told *Iron Age*. And consumer confidence remains high, says the latest report from the University of Michigan's Institute for Social Research.

"The evidence suggests that con-

sumers expect an extended period of slow growth but nonetheless favorable economic conditions," said Richard T. Curtin, survey director. "No evidence indicates that the slowdown is expected to lead to a recession during the year ahead."

"Things look reasonably good for 1985," said one automotive analyst. "It's 1986 that will be the problem year."

"I doubt that 1985 could turn into a sour year," said the vice chairman of one Big 3 automaker. "We've got too much momentum," he explained. "We in the car business have become so convinced that cycles are inevitable. But they're not. They're inevitable only if Washington doesn't do its job right."

"If the federal government deals with the deficits seriously, we could live through several more years of a healthy economy. But if it doesn't, we'll be tested again in—pick your year—1986 or 1987."

Another problem is the weakness of the Japanese yen relative to the dollar. One executive estimates that \$1,500 of the \$2,500 difference between the selling price of the average Japanese and U.S. car is due to an undervalued yen.

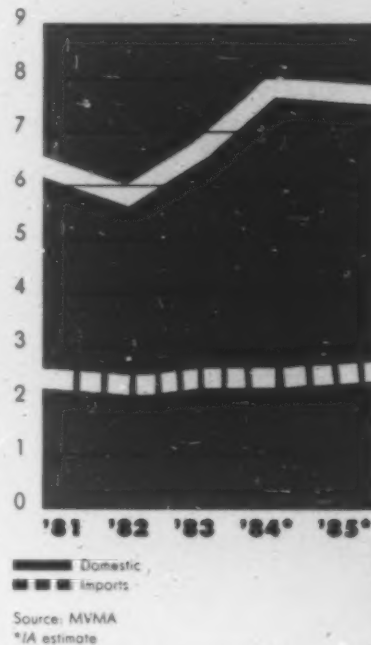
Tax structures of the U.S. and the rest of the world put American carmakers at a distinct disadvantage. The Japanese and Europeans tax sales heavily and corporations lightly, and there is no sales tax on exports. U.S. firms pay much higher corporate taxes than do their overseas competitors.

The Big 3 chief executive and operating officers have begun speaking out forcefully on the need to have fair exchange rates and to have American and foreign firms pay taxes equally.

The automakers' profits should continue in 1985 at the same record levels as in 1984.

Most predict car sales in the first half of '85 will be stronger than the second half.

Automotive, Sales
Millions of Units

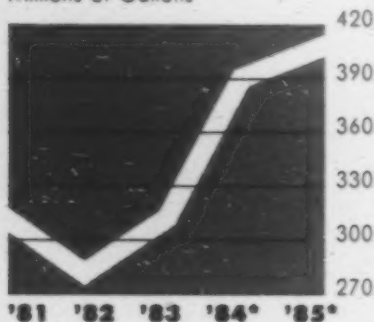


INDUSTRIAL COATINGS; PLASTICS

Prospects are improving for the industrial coating market in the year ahead.

Industrial Coatings, Shipments

Millions of Gallons



Source: U.S. Dept. of Commerce
*IA estimate

Plastic Resins Sales & Captive Use

Billions of Lbs



Source: SPI Committee on Resin Statistics, compiled by Ernst & Whinney
*IA estimate

INDUSTRIAL COATINGS—Shipments of industrial coatings likely will grow from an estimated 390 million gallons in 1984 to 410 million gallons in 1985.

The strongest growth will come in coil coatings. An executive in one coil-coating firm forecasts that market to grow by 10 pct in 1985. He expects the total market for industrial coatings to increase by 8 pct this year.

Other industry executives are more cautious. "We've had two record years in a row at our company," said the vice president of a leading coater. "1984 was a fantastic year for us. We'll have trouble matching our 1984 figures in 1985."

He expects industry shipments in 1985 to drop 5 pct below or at best equal those in 1984. "Coil coatings will grow by 7 pct at best in 1985," said the vice president. "But its growth rate has flattened since April 1984. Before then, coil coating was growing at 15-pct rates each year."

"We're shipping more coil coatings to automakers," said the executive, "mostly for uses like seat parts, hanger bars, and under-hood parts."

For the entire industrial-coating industry, said one vice president, "office equipment should be the shining light of 1985. It's booming now and should stay strong through most of 1985."

One trend troubling the coating makers is the growing number of laws requiring them to label all possible hazardous chemicals. The laws and lawsuits will accelerate the trend toward higher-solid coatings.

"The industry has gone from 30 to 50 pct solids in the past few years," said one vice president. "That's reduced the number of gallons by 3-5 pct each year. The trend probably will continue until our coatings contain 70-80 pct solids."

PLASTICS—The plastics industry enjoyed a 5 pct increase in the sales and captive use of all plastics this past year over 1983.

The bigger area of the two, thermoplastic resins, which includes such materials as the polyethylenes, polypropylene, ABS, the nylons and the polyvinyls, had a strong year. This showing made up for the comparatively weak year exhibited by the thermosetting resins, which includes the epoxy and the phenolic resins.

Looking ahead, the prognosticators seem to be more conservative about 1985, wherein a 2 pct gain in overall sales and captive use seems probable.

There are those who have predicted that plastics has seen its miraculous growth and that, from hereon in, the market will flatten out at best. But, this was all before plastics began to penetrate the bottle and beverage can markets. This year will see more penetration into the container market.

According to one executive, plastics have just begun to penetrate the food packaging market. At present, plastics only has about 10 pct of this \$7 billion market. But, plastics R&D is churning out new materials all the time and it will probably only be a matter of time before most foods will be packaged in plastics. More of these substitutions will be seen in 1985.

Plastics will continue to chip away at the automotive market, where they now account for 7 pct of the nonstructural parts in cars on a weighted basis. Plastics producers are looking for that figure to triple in time, but 1985 is not expected to be a banner year in that regard.

Among the individual plastics moving well in 1984 are polypropylene, nylon resins, and polyvinyl chloride and copolymers.

MACHINE TOOLS; FLUID POWER

MACHINE TOOLS—Machine tool manufacturers are still being bombarded by foreign producers and few expect good news in 1985.

"All you have to do is look at the latest figures on the import share of market and you'll see what we're up against," said one U.S. lathe maker.

Still, not everyone in the industry is in favor of 232 and quotas.

Major markets for the industry are expected to continue their recovery well into 1985. "We're quite confident that the first half will be good. We're not so confident about the rest of the year. That deficit spending routine cannot go on forever. That's why we're worried," said an industry executive.

Others expressed hope that the recovery be as "classical as possible" so that the manufacturing world would see slow but steady growth.

But, even should the American machine tool market boom in coming months, there's some question about what share of the market would be domestic and what share foreign.

"We're looking for a very good first half, with or without 232," noted one Midwest builder. "All that we're worried about is the economy in general. If we don't start talking ourselves back into a recession, we see every reason for a steady climb back up to 1979 levels. The pent-up demand for modern machinery must be enormous," he added.

Other machine tool manufacturers noted that interest rates are still out of line. "Some people don't believe low inflation rates will stay low," pointed out an industry analyst.

This year is believed to be better than 1984 with a much better first half. But, as one builder put it, "much of our future, like it or not, is made in Washington."

FLUID POWER—The fluid power industries continued to grind down in the fourth quarter of 1984 in many of the important market areas.

One of the big sources of decreased activity seemed to lie with heavy mobile equipment.

The industry is being conservative in its forecasts for 1985. Producers of hydraulic systems for farm and construction machinery still were revising 1985 forecasts downward in the closing months of 1984 and are now only looking for a 5 pct gain in 1985.

For an industry that was showing gains of 50 pct in first quarter 1984, the 1985 estimate comes as quite a cutback.

It comes as no surprise that part of that caution is concern about imports into the U.S. market.

European producers are forecasting for 1985 to average out at about 3 pct. Some producers of hydraulic systems in the Far East are estimating gains of 10 pct in 1985 with a substantial portion of that total aimed for the North American marketplace.

Import tonnages could impact prices as well as volume. The general pricing trend has not been moving ahead as well as volume gains would have suggested during 1984.

It looks like 1985 is going to see a reoccurrence of that problem. In 1985, the dollar gain won't be as great as the potential for actual increases in sales.

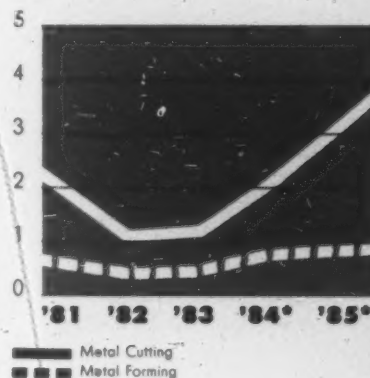
A number of companies, as reported in earlier *Iron Age* forecasts, have been introducing new products during 1984. This will help a number of companies and will offset lukewarm prospects in some markets.

All indications appearing on the horizon point to a very moderate 1985 gain in dollar volume.

Despite imports, the machine tool industry looks for an improved year.

Machine Tools, Net New Orders

Billions of Dollars

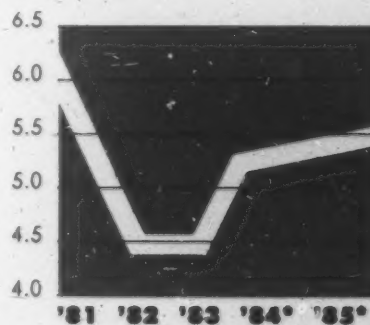


Source: NMTBA

*1A estimate

Fluid Power Shipments

Billions of Dollars



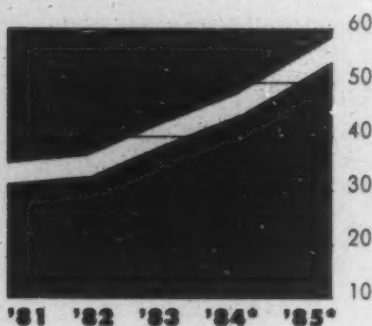
Source: U.S. Dept. of Commerce and NFPA

*1A estimate

COMPUTERS; INSTRUMENTS & CONTROLS

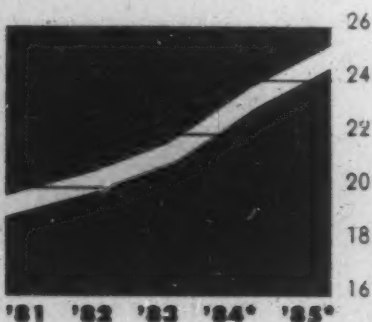
There just seems to be no stopping the fantastic growth in computers.

Computers, Shipments
Billions of Dollars



Source: U.S. Dept. of Commerce
*IA estimate

Instruments & Controls, Shipments
Billions of Dollars



Source: U.S. Dept. of Commerce
*IA estimate

COMPUTERS—Despite predictions of a slowing economy in 1985, the computer industry should enjoy another year where the rate of growth approaches 20 pct. The computer revolution that started in the major corporations, is still finding fertile ground in the offices and factories of medium-size and small-size manufacturers. But while mainframes and minicomputers will continue to sell well, microcomputers and personal computers continue to receive the lion's share of the interest and should again lead the pack.

Even hotter than personal computer sales are the sales of software to run computers. Sales last year grew at a rate approaching 35 pct. This year, that 35 pct growth rate should continue.

Rather than buy large pieces of capital equipment like machine tools to improve productivity, manufacturers, to a large extent, are turning to the computer and an increasing amount of software that is available in order to improve production efficiencies. To address production more directly, computers are moving closer and closer to where the action is: the shop floor. Personal computers, for example, are becoming more rugged and are appearing in various guises directly on the shop floor to run machinery, act as terminals, and perform independent analysis and control.

While computer equipment sales remain strong in this country, the increasing number of computer components and peripherals that are produced overseas and imported into the U.S. is a growing concern.

Because of these imports, the U.S. actually has a trade deficit in computer equipment. That deficit should ease a bit in 1985. The U.S. dollar is expected to weaken this year which should make computer products more attractive overseas.

INSTRUMENTS—Shipments of all types of instruments and controls in 1984 rose about 10 pct, to an estimated \$23.5 billion, reflecting a strong increase in investment in plant and equipment during the latter half of 1984. The outlook for 1985 is for continued growth and appears to give credence to the Dept. of Commerce's earlier projections for the industry to grow at a compound annual rate of 3 pct through 1988, after adjusting for inflation.

The dip in interest rates at the end of 1984 favors a stronger construction industry in the first half of 1985 for residential and non-residential construction, both of which translate into increased business for the instrument and controls manufacturers. At year's end, the construction industry reported modest gains in new starts and described the industry's condition stable.

Environmental and energy-saving controls are on an upward trend and are expected to continue at a high level, as both residential and non-residential users modernize and replace controls with those having greater capability and reliability.

U.S. exports of industrial process controls rose slightly, by 3 pct, in 1984 to \$688 million, based on six months figures. This may seem gratifying in view of the strong U.S. dollar, weak foreign economies and increased competition from overseas firms, but the shocker to the industry is a 44 pct increase in imports in 1984. Imports of industrial process controls represented a \$300 million loss in domestic sales.

Industry analysts point out that part of the loss to imports is due to suppliers who have moved to Canada and Mexico. More important, exports from Japan represented a major portion of the imports and their 1984 sales doubled.

TUBULAR GOODS; MINING EQUIPMENT

OIL COUNTRY—A strong increase in shipments of oil country tubular goods appears likely to continue through the remainder of 1984. Most industry indicators remain strong, and many officials foresee a strong growth trend continuing well into 1985.

The market is being aided by a number of factors. The rig count utilization rate has climbed steadily since April and has increased some 12 pct over the comparable period of one year ago. Crude oil prices have remained stable; most experts foresee that trend continuing through at least the end of the year.

The total footage of oil and gas wells drilled in the U.S. is up nearly 14 pct from last year. Also, excess inventories of pipe and tube have begun to evaporate.

Despite the generally positive trends, there are still some potentially adverse elements that could impact the industry. While OCTG shipments may nearly double from their 1983 levels by the end of this year, they are far below the peak years when domestic mill shipments averaged 2.5 million tons annually. The most positive predictions for 1984 foresee 1.2 to 1.3 million tons shipped from domestic mills.

Foreign mills have dominated the market for most of the year, and increased shipments of imports have out-paced domestic production.

Another issue is that recent pipe and tube consumption has been greater in the carbon grades than the more expensive alloy grades, but recent drilling has been concentrated in more shallow wells.

Looking ahead, increased drilling activity in the Gulf Coast and new exploration efforts off California are good reasons for optimism. Nevertheless, a battle is likely between domestic suppliers and their aggressive foreign counterparts.

MINING EQUIPMENT—This year mining equipment can be expected to be a mixed bag, and perhaps a very dismal year at least for the first half.

The two-year-old recovery has eluded most mining equipment companies. In fact, as 1984 came to a close, the mining industry was, in some areas, in its worst shape since the 1930's. This scenario was particularly true of iron ore mines.

Iron ore property owners continue to close and sell mines, and cut back production throughout the Upper Peninsula of Michigan and northern Michigan. One reason was the slump in steel, but a more ominous threat was foreign ore.

With iron ore mines closing and coal companies worried about acid rain and energy conservation, there seems little to feel optimistic about for 1985.

Over the past year, coal mining equipment manufacturers found 1984 to be more generous to them than any year since 1979. However, "our industry hasn't had anything happen to it that I'd call generous in quite some time," said one coal equipment maker. "Things do seem to be moving up steadily and I'm convinced 1985 will be more of the same steady growth as 1984."

Coal has no import problem. What hinders coal is the decades-old pollution issue. "Everybody says coal is great until you burn it," quipped one industry expert.

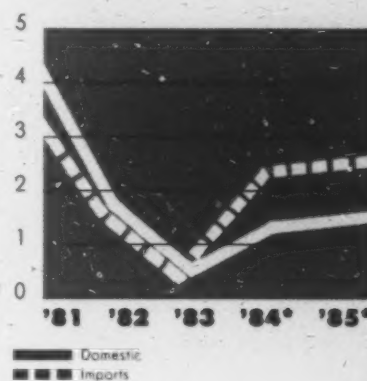
What bothers coal company executives is the growth rate in coal usage. "The stuff still lights up the country and keeps Houston habitable," noted one coal executive.

Other types of mining are not nearly so cheerful as King Coal. Copper mining was no source of optimism for equipment makers in 1984 and this coming year is expected to be no improvement.

It seems that business in the oil country is showing signs of improvement.

Tubular Goods, Shipments

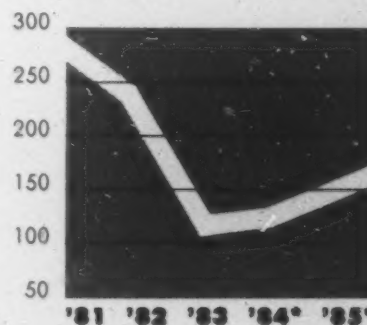
Millions of Net Tons



Source: AISI
*IA estimate

Mining Equipment, Sales

Millions of Dollars



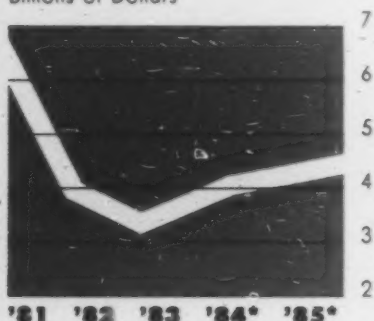
Total U.S. and export figures, based on present dollars; includes continuous miners, mobile loading machines, shuttle cars and cutting machines.
Source: Mining Equipment Manufacturers
*IA estimate

CONSTRUCTION; FARM EQUIPMENT

The problem has been that the recovery is well below the peak levels of '80 and '81.

Construction Equipment Shipments

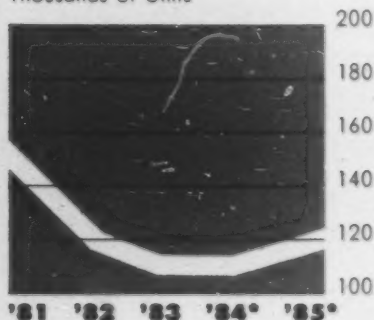
Billions of Dollars



Source: U.S. Dept. of Commerce
*/A estimate

Farm Equipment, Wheeled Tractor Sales

Thousands of Units



Source: Farm & Industrial Equipment Institute
*/A estimate

CONSTRUCTION EQUIPMENT—

The recovery in construction machinery shipments that got underway in 1983 continued into 1984, with retail sales up strongly in the first half of 1984. This recovery of lost ground drove shipments up almost 30 pct in 1984, though the rate was much stronger, on a year-to-year gain basis in the first two quarters of 1984.

The outlook for 1985 is considerably more cautious for an industry that got a stronger recovery in 1984 than had been expected. The problem has been that the recovery still is well below the peak levels reached in 1980 and 1981. It is hampered stiff price competition.

Not only is the import problem proving more difficult each year, but export sales that were at one time 50 pct of the sales totals for a number of big U.S. machinery builders, are still sinking. Industry observers are also watching plans by off-shore equipment builders to step up their efforts in the U.S. market in 1985.

Mitchell Quain, of Wertheimer & Co., speaking at the Construction Industry Manufacturers' Association (CIMA) Annual Forecast Meeting, said 1984 was up about 30 pct, (about 10 billion in shipments) a little stronger than the sample taken by CIMA among its members.

The forecasts for 1985 are cautious. Though the average predicted gain is about 9 pct, some big ticket items like crawler tractors are predicted to go up only 4.5 pct in the U.S. market and a little less than that in the Canadian market. But the most positive outlook is in the highway related machines, where gas tax money, about \$20 billion of it by one estimate, is moving into the marketplace in growing quantity which could result in paving machines moving up 12.7 pct in 1985, on top of a 1984 gain of 25.7 pct.

FARM EQUIPMENT—With cut-backs at nearly every major farm equipment company, prospects from a supplier standpoint don't look to be much better than a 4 pct gain in 1985. Efforts to cut back dealer field inventories, partly successful during 1983, were undone when the industry began to pick up for 1984 on a forecast of a 10 to 15 pct gain.

Farm equipment forecasts, originally expected to show a stronger 1984, slipped steadily through the year. Despite some recovery in farm commodity prices in the first half of 1984 and the advent of PIK money and some new export grain orders, 1984 continued to look less attractive as the year wore on.

Almost every new forecast that came out during 1984 showed another downward revision. By the end of the first three quarters, combines were off 21 pct for the year, the Farm & Industrial Equipment Institute noted in a recent survey of its members. Combines and tractors are the two biggest dollar items on the farm equipment list. Farm tractors were down about 2 pct.

In addition, items like forage harvesters which had held up relatively well in the past, were off 20 pct.

Ford Tractor's M. H. Manning said earlier a 4.2 pct gain in 1985 tractor sales was possible but cautioned that low crop prices and weak export markets would affect the industry all of 1985.

J. I. Case president Jerome Green also put the forecast in the 3 to 5 pct range, and Victor Rise of Massey-Ferguson Ltd., sees little change in the U.S. or Canada in 1985 over the past year.

Traditionally, the first and second quarters are the strongest manufacturing periods for farm machinery. But as the fourth quarter closes there's no sign of it occurring any time soon.

APPLIANCES; MATERIAL HANDLING

APPLIANCES—The outlook for the major appliance industry's shipments during 1985 continues to be upbeat following a record-setting performance in 1984. Shipments by the end of 1984 are expected to exceed 39 million units, the highest level reached since 1973 when shipments amounted to 35.8 million.

Among the star performers in the industry were sales of microwave ovens. These appliances took a dramatic upturn during 1984, with shipments exceeding one million units during the month of October. This was a first for the industry.

Combination microwave/oven-ranges gained with consumers; in the first ten months of 1984, sales increased 57.5 pct over 1983.

With no negative factors affecting the industry at the end of 1984, most producers are optimistic.

Many positive indicators support the forecast for continued improvement in major appliance shipments during the first half of 1985. Some industry analysts project a decline in shipments toward the end of 1985 because of the threat of sustained high interest rates.

With a six-month lag between housing starts and appliance sales and interest rates dipping at the end of 1984, sales could receive a shot in the arm during the first quarter of 1985. The replacement market is encouraging and industry sources point to the 280 million units sold during the 1962-73 period. This could mean a huge replacement market for some time to come.

The consumer need for an increased number of features, greater reliability and versatility of solid state control technology, and improved energy efficiency are the driving forces in the replacement market. The new models are no mere cosmetic substitutes for the older models.

MATERIAL HANDLING—Most companies in the material industry expect a continuing upward trend in the first half of 1985 following a very significant improvement in business in the second half of 1984.

"We're way up over 1983, but that's putting us at hardly half of our last good period," said an industry source. "We are cautious about 1985, especially late 1985. The deficit, to me, is the big problem or symbol of the problem the whole economy faces. If that starts to come down significantly, then we can see long-term steady growth."

Others in the industry agree. Material handling companies, in general, reported healthy statistics throughout 1984 with some gloomy spots in the industrial truck end of the business. "We see 1985's trend as similar to 1984's," said one large systems company. "But, I wouldn't want to be in the lift truck business today or tomorrow," he added.

The "lift truck problem" actually puts light on the fact that the domestic material handling industry has had little problem with foreign competition. Except for trucks, the industry's products and services are customized to an extent that foreign market penetration has so far been negligible.

Others in material handling said they believed that industry is still in an inflationary state psychologically. "The reason interest rates remain where they are is that people don't believe inflation is really under control. Those interest rates, in turn, keep quite a few of our customers out of the market for our products," one large systems maker explained.

"Our optimism is perennial," said one observer. "We believe we make something essential. Unfortunately, the market doesn't always buy what it's supposed to buy."

These are boom times for appliances. How much longer will it last?

Appliances, Shipments,
Millions of Units



Source: Association of Home Appliance Manufacturers
*IA estimate

Material Handling, Shipments
Billions of Dollars



Source: Material Handling Institute
*IA estimate

CASTINGS; FORGINGS

It would appear that the big spurt in castings has finally come to an end.

Ferrous Castings, Shipments
Millions of Tons



Source: U.S. Dept. of Commerce,
Iron Castings Society
*IA estimate

Impression Die Forgings, Shipments
Billions of Dollars



Source: Forging Industry Assn.
*IA estimate

CASTINGS—The foundry industry has exceeded all its forecasts in 1984. The industry increased its performance by huge margins over what it had expected a year ago.

The same cannot be said this year, however. Triggered by unseasonal declines in October and September of 1984, a number of castings producers began to cut 1985 forecasts back almost as soon as they'd written them.

Business was still good through the fourth quarter.

The opinion is that 1985 will be a year of few gains and the second half could see a slide backward. The foundry industry traditionally does its best business in the first and second quarters. There is some conjecture, however, that the second half of 1985 will see a new wave of import competition. This competitive force has been gaining steadily and hasn't been offset by any gains in offshore sales by U.S. producers.

The outlook as the year begins is for about a 3 pct gain in ferrous castings and a 5 pct gain in nonferrous castings. The gains in nonferrous will be led by copper and brass in the fourth quarter of 1984, while aluminum castings are expected to exceed what many forecasters thought possible.

There is also more comment about "reciprocity." A company that exports from the U.S. and builds or assembles its export goods in foreign markets is being told it must buy more components abroad if it wants to sell overseas.

In 1985 the situation could get worse. Some forecasts by U.S. foundries are already based on that assumption. Foundries that scored a 20 pct plus gain in tons shipped in 1984, talk now about zero gains in 1985, and possibly a "mini-recession" that will push shipments below 1984 level.

FORGINGS—Despite major pick-ups in orders and shipments in 1984 compared to 1983, business for many forging companies last year was no better than average. Despite a few bright spots, such as improved sales to automotive firms, the continuing depression of many markets that traditionally are heavy users of forgings such as commercial aircraft, farm equipment, construction, and the oil field goods markets, made 1984 a lean year for many forging companies.

Preliminary figures indicate that 1984 shipments of custom impression die forgings reached \$2.6 billion, a 24 pct increase over 1983 shipments of \$2.1 billion. Custom impression die forging bookings also approached \$2.6 billion, an increase of 29 pct over 1983's \$1.9 billion. Although shipments improved last year, they were far (without even considering inflation) from the \$2.9 billion 1981 figure.

In 1984, forging orders slipped in the third quarter after a respectable showing in the first two. And early indications are that the fourth quarter was about on par with the third. Some improvement, however, in the first quarter of 1985 is expected.

The performance of this year depends on several key factors. One is the continuing vigor in the auto industry.

A second key is a resurging petrochemical industry. Last year there were scattered indications that the industry purchases were increasing. Officials believe these few orders will grow through 1985.

Key number three is a long-delayed pickup in the aviation and aerospace industries.

If these keys do not unlock new business and if imported forgings increase markedly in 1985, the impression die forging industry will be in for a long year.

AIRCRAFT; ENGINES & TURBINES

AIRCRAFT—The major airframe manufacturers continue their slow but steady climb out of the recessionary economy that has been affecting the industry for more than two years. Orders for new aircraft were dramatically higher during the first half of 1984 than they were a year ago. Most industry officials are looking for this order surge to abate in the third and fourth quarters. Even so, new orders for 1984 already have surpassed the severely depressed level for all of 1983.

Restored profitability for airline companies operating both in the United States and overseas is being cited as the single most important factor working to bolster the industry. Lower fuel prices also are helping the airline firms climb out of the recessionary spiral and update their fleets with new orders for more fuel-efficient aircraft.

Nevertheless, despite projected growth in passenger traffic for the third and fourth quarter, industry officials remain cautious. There continues to be excess capacity, especially in the wide-body jetliner portion of the industry. There continues to be price pressures on airframe manufacturers which is resulting in unique financing arrangements and the trade-in of older airplanes.

For example, Seattle-based Boeing Commercial Aircraft Co. announced in mid-August that Saudia, the national airline of Saudi Arabia, had ordered 10 747-300 airliners, a deal valued at about \$1 billion. But Boeing agreed to be paid for the aircraft in a quantity of oil equal in value, at the official government price, to the price of the airplanes.

Such barter arrangements are relatively unique to the industry. But they underscore the lengths to which airframe manufacturers must go to successfully conclude sales of new craft.

ENGINES & TURBINES—Shipments in this wide-ranging market have held steady or slightly improved during the past few quarters, a trend that should continue through 1985.

Some improvement has been noticed in selected segments of the industry. Diesel engine makers report slightly increased activity in engine sales as a result of leveling interest rates and an improving stock market. But the long-term confidence level remains uncertain, and many customers are holding back until they are convinced the generally positive economic trends will hold up through the fourth quarter.

The oil segment of the industry remains sluggish. The hydropower end of the market is being affected by imports. Construction equipment has shown some improvement, but the uncertainty surrounding future interest rates makes any prediction of a substantial recovery in that segment dubious.

As for giant turbine generator sets, these continue to suffer as utility companies scale back earlier plans for expansion. The continuing controversy over nuclear energy—and the well-publicized problems facing several nuclear plans that have either recently opened or are soon scheduled to do—act as further drags on the industry.

Many industry officials and analysts expect a rebound of sorts to take hold. But it is unlikely to occur in the second half of 1984. A move to substantial orders for new engines and turbines probably would not be felt until some time in 1985. Short-term predictions continue to remain cautious, as they have through most of the year. The well-publicized general economic recovery will have to be sustained for a long period before the results translate into new orders.

There continues to be excess capacity in the wide-body portion of the industry.

Commercial Airplane Orders

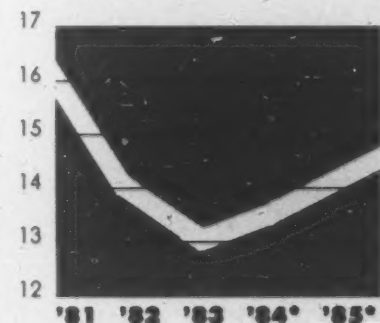
No. of Planes



Source: Airbus Industrie, Boeing and McDonnell-Douglas
*A estimate

Engines & Turbines, Shipments

Billions of Dollars



Source: U.S. Dept. of Commerce
*A estimate

WELDING; HEAT TREATING

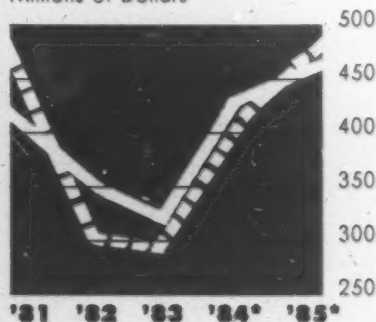
The long predicted growth in robotic welding still has not taken place.

Welding, Shipments
Billions of Dollars



Source: National Welding Supply Assn.
*1A estimate

Heat Treatment
Millions of Dollars



— Billings of Commercial Heat Treaters
— Heat Processing Equipment Orders

Source: Industrial Heating Equipment Assn.
Metal Treating Institute
*1A estimate

WELDING—The welding industry came out of its doldrums with a \$3.3 billion year in 1984. This was a strong 18 pct gain over the previous year. Statistics compiled by the National Welding Supply Association, Philadelphia, also show a healthy 18 pct gain in business over 1983. Looking ahead, business should pick up by 5 pct or so.

For the first year in history, the sale of continuous welding wire exceeded that of stick electrodes. Industry pundits say that trend will continue next year and so on.

The health of the welding industry is somewhat remarkable because commercial shipbuilding, a huge market for welding, went overseas years ago. Now, another big welding market, the pressure vessel fabrication business, appears to have gone overseas as well.

The long predicted growth in robotic welding still has not taken place, although it could gather momentum this year. The sale of robots for welding increased in West Germany from 250 units to 800 in a single year, and the United States tends to follow several years behind the West Germans when it comes to opening up new markets in welding.

Automation is making its presence felt, especially in the smaller shops, and the microprocessor is becoming a more familiar sight in many weld shops.

As far as new business is concerned, a welding distributor in the Southwest said: "The deregulation of natural gas will be an impetus in the expansion in the chemical industry here, and equipment sales are posting big gains now."

Some executives indicate that business is beginning to flatten out and that most big users of welding equipment are not ready to spend on new equipment but seem to be content to "shore up" what they have.

HEAT TREATING—A very conservative sales forecast of 7.5 pct in heat treating is the expectation by a number of heat treating companies—though individual heat treating companies show a wide range of estimates from zero gain up to as much as a 20 pct climb during 1985.

In the first nine months of 1984, metal heat treaters had already scored a 36 pct gain. In first quarter, heat treating billings were up 40 pct from the year-ago period in first quarter. Billings dropped slightly in second quarter, but managed to post a gain over the year earlier.

Heat treating equipment sales were more volatile. Sales were up 37 pct in first quarter of this year, according to reports from the Industrial Heating Equipment Association (IHEA). Sales also posted a gain of 80 pct in domestic equipment orders in second quarter of 1984.

The total figures are even more impressive. Foreign orders for equipment, because of the strength of the dollar, were down 23 pct for the first half of 1984. They decreased from \$19.4 million in the first half of 1983 to \$14.9 million in the first half of 1984.

The dollar value impact will be even tougher in 1985, industry observers said. Not only will the dollar continue to be relatively high in value compared with other currencies; but foreign capital goods producers are expected to make a particularly heavy thrust into American domestic markets to reap the advantages of their low currency values before the dollar does begin to soften again.

Heat treating, since it does much less export than do the heat treat equipment builders, isn't as directly affected. But capital goods builders are an important user of heat treated metal and their caution about 1985 is going to be reflected in only very moderate advances during 1985.

SCREW MACHINE PRODUCTS; FASTENERS

SCREW MACHINE PRODUCTS—

Reflecting the general recovery experienced in the latter months of 1984, the screw machine products industry's shipments increased an estimated 10 to 11 pct over 1983, with shipments valued, in constant dollars at \$1.325 billion in 1984 and \$1.188 billion in 1983.

Since a major portion of screw machine product shipments are for automotive products, industry analysts project slightly slower growth in 1985. Shipments of screw machine products in 1985 are estimated to increase 10 pct over 1984, to \$1.460 billion.

During 1984 the screw machine products industry expressed concern over how they and the automotive manufacturers could implement the concept of 'just-in-time' delivery. While the concept strongly favors screw machine product suppliers, it also presents some severe problems, particularly in the area of shorter batches and increased statistical quality control of the product. As the industry wrestles with this problem, at least both parties recognize that the very nature of just-in-time delivery implies that the suppliers are outside vendors.

The domestic screw machine industry is also expected to benefit by anticipated future limitations of off-shore deliveries.

However, offsetting this positive note is the fact that imports of consumer electronic components and automotive products, either as components or as complete vehicles, must be considered by the industry as indirect imports and thus very much a negative factor on the well-being of this industry.

The number of screw machine shops has been relatively stable compared to 1977, with about 1,765 establishments, including 634 firms that employ over 20 employees.

FASTENERS—

While the recovery was moving ahead in the fastener industry's markets in 1984, domestic nut and bolt makers were not roaring about their own upturn. What the recovery meant for standards makers in the U.S. was a terrific import increase, and there will likely be more of the same in 1985.

"There is no way we can compete with foreign sources of standard nuts and bolts. This industry has been shrinking for years and the recovery has actually moved that ahead by inviting a huge increase in foreign product," lamented one U.S. standards producer.

Engineered fastener makers reported a very good 1984 and suggested a better 1985. "We expect 1985 to be up over 1984 for us by 35 pct. That, of course, is up over a mediocre year," said one official.

The industry reported a more optimistic outlook, particularly for first half of 1985, than it has had for the last few years.

Order rates are up in all major markets for engineered fasteners and, even with the import surge, some U.S. commodities producers reported healthy business expectations for 1985.

For the first half of 1985, most companies projected an increase of between 10 and 15 pct over the last half of 1984. A few are much more optimistic. "Defense spending will move the order rate up enormously in 1985," said one manager.

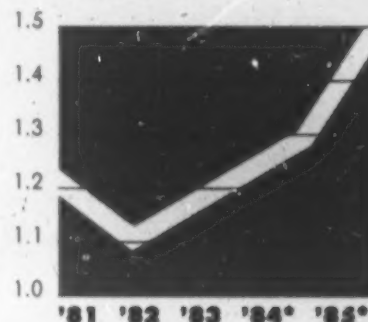
"As for imports, that seems to be a permanent part of our business landscape. However, I don't believe we're going to see any more companies leave the business. I believe what's left is competitive and profitable," said one industry analyst.

Others in the industry agree and predict a 1985 that will show significant increase in sales of fasteners of all types.

Shipments in 1985 are estimated to increase 10 pct. over 1984.

Screw Machine Products, Shipments

Billions of Dollars

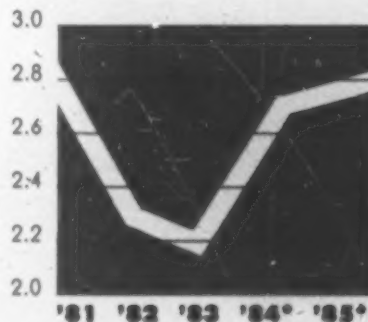


Note: Includes products produced by single spindle and bar automatic machines only.

Source: U.S. Dept. of Commerce
*IA estimate

Fasteners, Sales

Billions of Dollars



Source: Industrial Fasteners Institute
*IA estimate

BEARINGS; STAMPINGS

BEARINGS—The antifriction bearing industry, which saw growth of about 12 pct in 1984, will be hard pressed to do as well in 1985. An increase in constant dollars of 6 pct is predicted for the 1985.

The real driving force in the improvement of bearing sales last year was the strong showing of the automobile industry. Most experts expect slower auto sales rates in 1985. Car and truck sales should remain strong through the first six months of this year and tail off in the last two quarters.

This decline will come, say experts, because of slowing real income growth, rising interest rates, and a slowing economy. A cooling economy will affect more than just bearing suppliers to the automobile market. Sales to the appliance industry, should level off also.

A substantial increase in bearing imports will also help depress domestic bearing sales this year. After a decline in imported bearings in 1983, 1984 experienced an increase of 27 pct over the year before. Officials are predicting the rate of increase in 1985 will be in the neighborhood of 16 pct.

Despite the surge in the economy in 1984, a number of industries that are traditionally major buyers of bearings had mediocre years last year. These include the machine tool industry, which has seen some pick up but not the significant order increase that was expected. The construction equipment and especially the farm machinery builders have had a gloomy year, as have the aerospace and oil field goods industries.

Some of these depressed industries, however, could show some life this year. Demand for aircraft should pick up, especially if the dollar weakens, and there are some indications that the oil field market will grow this year.

STAMPINGS—Although the lustre of 1984 began to disappear in the latter half, stamping industry officials sound reasonably certain their industry won't be tarnished much this year, at least through the first half.

Last year was a good one for the industry, with orders expected to finish between 15 and 17 pct higher than 1983.

While most stampers agreed on a plateauing of shipments in 1985, they're still looking for a 'reasonably' good 1985.

A glance at the December, 1984 report from the *American Metal Stamping Assn.* showed contract metal stampings shipments up sharply in October, hitting the highest monthly level since March, 1984. October shipments moved up 12 pct from the previous month, and were 15 pct ahead of the October 1983 figure. Year-to-date shipments were up 29 pct ahead of figures for the first 10 months of 1983.

"All things considered, it looks like October will represent the high-water mark for shipments in the second half of 1984," enthused AMSA president Jon E. Jenson, adding that a gradual decline for November and December was likely.

A look at stamping markets showed Detroit coming off a banner year in 1984. This performance by the automobile producers benefitted stampers serving the industry.

In other industries; although mortgage rates crimped housing starts in 1984, this didn't dent appliance sales as the industry posted a tremendous year.

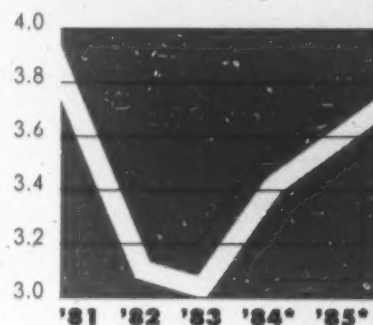
Additionally, stamping industry officials look for no orders decline from either their business machines or computer customers.

As for inventory building, less than more stampers are piling up their stocks in 1985.

Officials predict the rate of increase in 1985 will be in the neighborhood of 16 pct.

Antifriction Bearings, Shipments

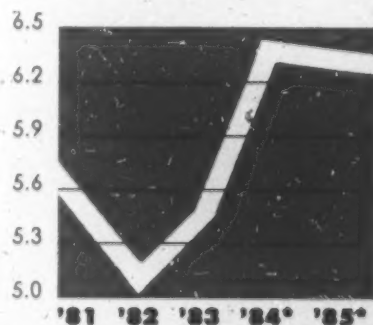
Billions of Dollars



Source: U.S. Dept. of Commerce
*IA estimate

Stampings, Shipments

Millions of Dollars



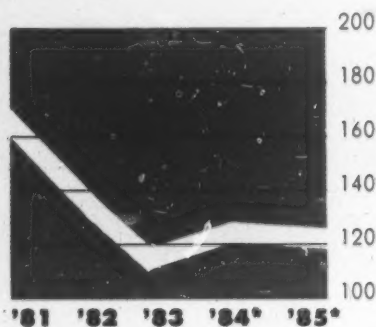
Based on the average of a control group whose shipments total more than \$500 million annually.

Source: American Metal Stamping Assn.
*IA estimate

GEARS; VALVES

Conservative, forecasts call for 1985 orders to increase about 4 pct over the 1984 level.

Gears, Bookings

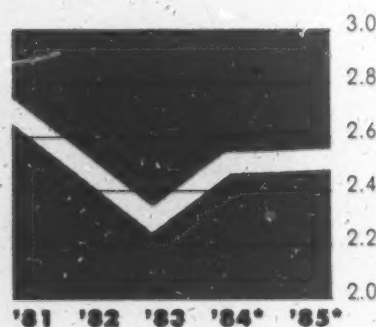


Based on average monthly bookings, 1977 = 100

Source: American Gear Manufacturers Assn.
*1A estimate

Valves, Shipments

Billions of Dollars



Source: Valves Manufacturers Assn.
*1A estimate

GEARS—Trailing the general economy by some six to nine months, the gear industry is still feeling the economic euphoria the market exhibited in the first-half of 1984.

Consequently, the third and fourth quarter pinch felt by some other industries shouldn't be affecting gearmakers until the first quarter of this year.

Conservative industry forecasts see 1985 orders increasing about 4 pct over the 1984 level.

This past year, the industry's improvement was revealed in September figures from the American Gear Manufacturers Assn., which showed bookings had risen 16.7 pct in industry dollars from the previous month and stood 24.9 pct ahead of the September 1983 level.

However, the AGMA report also noted that September 1984 shipments trailed those of a year ago.

For instance, in September 1983 they stood at \$70.3 million compared to \$64.2 million the same month of 1984.

An Eastern gear manufacturer voiced his concern over "the continuing slide of the major economic indicators during the latest months," which, he feels, are a harbinger of recession.

Generally though gearmakers see more of an upturn for their products. As one source pointed out, apparently nobody has told Chrysler that auto sales have slipped in recent months. The company has not only recalled laid-off workers but, according to chairman Lee Iacocca, is now "hiring off the street."

Still, some gearmakers think auto sales will taper off in the third and fourth quarters of 1985, early 1986.

These same gearmakers are also concerned that the Reagan Administration's battle with the deficit will include cutting away some gear-consuming military contracts.

VALVES—1984 was a considerable improvement over 1983 for the valve manufacturers. Business moved ahead in the first half, but skidded during the third and final quarters.

Most industry officials size up this year as "a crapshoot."

For 1985, one industry observer is expecting a 2½ pct increase (in dollars) over 1984.

Industry forecasters explained that profit earnings in 1984 should be higher than in 1983 because of operating leverage, which some manufacturers put into proper place over the last few years as a result of cost reduction efforts and their expectations that prices will improve.

As for product sales growth, one valvemaking said it will be "across-the-board" this year.

Shipments for quarter 'turn' valves are expected to rise 12 pct in 1984 over 1983 and another 15 pct in 1985, while prospects for gate, globe and check valves are less optimistic.

In examining their domestic markets, industry observers see chemicals and petroleum relatively stable while nuclear power orders remain lackluster.

And as for new plant building, "it just isn't out there," said one Eastern valve manufacturer. This same manufacturer does envision some expansion at pulp/paper and water and waste-water treatment facilities.

Imports continue to get valve-makers' hackles up, particularly following a lost round recently to the Japanese over anti-dumping.

The continuing competitive activities of other foreign suppliers of steel valves and pipefittings continue to concern U.S. manufacturers, who are worried that downstream dumping will impact their market for perhaps four more years.

SHIPBUILDING; RAILCARS

RAIL CARS—The topsy-turvy rail car market had a fairly good year in 1984; that is, if you compare it to 1981 when 20,000 units were ordered. In 1984, orders moved up to 15,000 from a pitiful 6,000 units in 1983. But, industry analysts still look back to those years when rail car orders used to hit the 80,000 car mark.

On the other hand, those "pitiful years" of 1982 and 1983 have been described as the worst years the industry has experienced since 1938.

For next year, orders should move up a notch, to 16,000 cars. That should mean an improvement of about 5½ pct.

Over capacity continues to be the big problem. Domestic rail car producers have the capacity to turn out 90,000 units per year, yet tens of thousands of rail cars are still sitting around idle. The import problem seems to have straightened itself out, but, no matter how you look at it, the industry is still obviously in the throes of a recession.

Bethlehem Steel Corp. reported some good news early in October that it had received an order for 135 rail cars, most of which are for the Grand River Dam Authority of Oklahoma.

Over the near-term in R&D, the skyrocketing cost of diesel fuel has forced the rail car industry to put some money into the development of aluminum-rolling stock. Aluminum rail cars designed for coal transport have been developed, but it's all pretty much in the prototype stage.

The U.S. Department of Commerce is predicting that good times for rail car builders are just around the corner. The Commerce Dept., in fact, is looking at 1988 as a 90,000 car year. The government agency is also forecasting that 40 pct of all rail traffic shipments will be for coal by 1988.

SHIPBUILDING—Just when it appeared that the U.S. commercial shipbuilding industry was about to bottom out completely, Exxon Shipping Co. ordered two 209,000 dwt tankers from National Steel and Shipbuilding Co., San Diego. Then, Sea-Land Service, Inc., Iselin, N.J., ordered three containerships from Bay Shipbuilding Corp., Sturgeon Bay, Wis.

Don't let these orders fool you, however. The commercial shipbuilding industry will probably have to ride with these orders and nothing else through the rest of 1985.

Over in the Navy and Coast Guard side, shipbuilders are coming off a better year than 1983, which was the best Naval shipbuilding year in a long, long time. Next year probably will not keep pace with 1984, but it will not be far behind.

The Administration's projected 600-ship Navy was hacked to some extent in Congress for fiscal year 1985, but the remaining budget is still strong enough to keep a number of shipyards busy through the rest of this year.

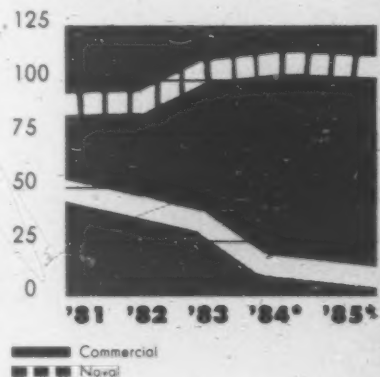
At present, 89 ships are being constructed or are on order. As far as additional contracts are concerned, the most one can expect in 1985 are 24. Thirteen of the present 89 will be completed this year, so 100 vessels would be the highest figure obtainable. Chances are, it will be less than that.

The long-range prospects are very rosy for Naval shipbuilding. During the next five years, the shipyards are expected to build 123 new ships for the Navy. Employment is expected to peak in 1989.

Expansions are under way at several yards, including Newport News Shipbuilding and Dry Dock Co., Avondale Shipyard, Bath Iron Works and at several locations of Todd Shipyards.

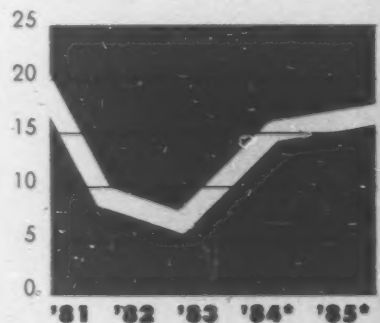
For next year, orders should move up a notch, to 16,000 cars.

Shipbuilding
No. of Vessels



Source: U.S. Maritime Administration and Shipbuilders Council of America
*IA estimate

Rail Car Orders
Thousands of Units



Source: American Railway Car Institute
*IA estimate

LOOKING BACK

IN 1984



Reagan won, Ruckelshaus quit and the Congress kept busy

Wins and losses characterized 1984, not the least of which was President Reagan's resounding re-election. But there were others, the effects of which are yet to be felt—in the

U.S. Congress, in legislation (passed and not passed), in President Reagan's Cabinet, and in Supreme Court cases.

A major election loss in businesses' eyes was that of Sen. Charles Percy (R., Ill.), the leading advocate for import relief for the machine tool industry. Another strong supporter of

the industry who will not be returning is Rep. Roger Jepsen (R., Iowa).

An outspoken legislator on copper industry issues—Rep. Jim McNulty (D., Ariz.)—was unseated. He will be replaced by Republican Jim Kolbe.

Generally though, little occurred this election to directly affect metals in-

dustry issues: Most House and Senate members active on steel, metals and metalworking industry issues will be returning to Washington in January.

From the White House side, losses this year included the resignations of Attorney General William French Smith, Environmental Protection Agency

(EPA) Administrator William Ruckelshaus and Secretary of Education Terrell Bell. Mr. Smith has been staying on pending Senate confirmation of his proposed successor Presidential Counselor Edwin Meese III. Mr. Reagan's appointment of Mr. Meese was highly controversial and remains unconfirmed.

In his resignation letter, Mr. Ruckelshaus said: "The ship called EPA is righted and steering a steady course. Employee morale is high, first-rate Presidential appointees are in place, a management system has been installed that is functioning well and all of the programs have generated momentum." Nevertheless, there are reports that the biggest cuts being proposed by the White House in its latest budget plans are those for the EPA.

There were some major legislative gains this past year following initial criticism that the first session of the 98th Congress was a "do nothing" period. Paramount among the measures signed into law was the Omnibus Trade Bill. Among the bills' provisions are clauses strengthening the government's hand in limiting imports of steel and mandating more domestic investment in the industry.

Also approved was a measure allowing companies greater latitude to form joint research and development ventures.

Two pieces of legislation passed by the Congress should lead to significant changes in how the Federal government buys goods and services. The measures will benefit

Imports Played A Larger Role in 1984

Steel Shipments in Millions of Net Tons



members of the National Tooling and Machining Association, which lobbied hard for their passage, interested in Defense Department spare parts business.

Steel got off to a strong start, but sagged in the second quarter

Steel producers went into 1984 expecting shipments to reach 77 million tons for the year.

That seemed a reasonable expectation. The auto industry was enjoying strong sales. In the second year of an economic recovery, it was reasonable to look for rising capital spending to boost plates, structurals and other products that go into capital goods.

There was, moreover, a trade agreement which limited steel imports from Europe to about 5 pct of U.S. supply. There was also supposedly some kind of understanding on shipments from Japan.

Through March 1984, the forecasts looked good. Shipments in the first quarter were at an annual rate of a little over 77 million tons. Steel prices, which had sagged to 1981 levels during the recession, began to firm. After losing \$6 billion in 1982 and 1983, the industry made a little money in the first quarter.

Then in the second quarter, the steel market went flat. Steel shipments, which normally rise in the spring, leveled off at about 6.5 million tons a month. New orders plummeted.

Shipments and prices fell sharply in the third quarter. Profits disappeared. And there was no real pickup in the fourth quarter.

Part of the explanation for the downturn was the failure of capital spending to revive. The big problem, however, was a steep rise in foreign shipments. Imports went from 17 million tons in 1983 to an estimated 26 million tons.

CONGRESS OF THE U.S.
THE U.S. CAPITOL
WASHINGTON, D.C. 20540

DAY TO
ORDER OF

THE DEFICIT

ONE HUNDRED FORTY-THREE BILLION, 300

FUNNY MONEY FEDERAL.
200 BILION AVE. N.W.
WASHINGTON, D.C. 20006
PENNY PAYMENT

Con

The Japanese agreement turned out to be non-existent or meaningless and the European restraint was offset by a 76 pct rise in shipments from developing nations.

Domestic producers addressed the import problem by filing unfair trade suits, by seeking legislated quotas, by calling for action under the injury provision of the trade act.

In this setting, the Administration announced it would seek voluntary agreements with the exporting nations.

Economy grew at a fast pace; capital spending also rose

The year 1984 started with a bang.

In the first quarter, the economy grew at a whopping 10.1 pct annual rate. That is growth measured by real GNP.

That was the strongest growth for any quarter since the second period of 1978. And it was a quarterly growth surpassed only twice over the past 20 years.

That almost too-hot pace cooled as the year

and quarter, the economy grew by 7.1 pct; investment by 21.3 pct. In the third period, the economy expanded at 1.9 pct and investment by 15.9 pct.

That relationship probably will have held fast when final data on the closing quarter is known.

GM reorganized, bought EDS; Peterson named to head Ford

Buoyed by record profits, automakers in 1984 began extensive reorganizations that will have far-reaching effects on the industry's future.

General Motors spent the entire year working out the details of the most sweeping reorganization

since 1960. The old car divisions will retain only the sales, marketing, and product planning personnel.

In June GM dropped another bombshell: its decision to acquire Dallas-based Electronic Data Systems (EDS) for \$2.5 billion. EDS will play a major role in streamlining the giant automaker. It will be the brains that tie together GM's massive data-processing system, keep track of dealers' orders and in-process parts, and handle health claims from personnel. GM expects EDS' added efficiency to cut GM's healthcare costs by 10 pct.

EDS not only will help

A. Iacocca devoted 40 pages of his autobiography to "getting even" with former Ford Chairman Henry Ford II. Mr. Ford fired Iacocca in 1978, and Mr. Iacocca's never-forgiven him. Iacocca hit the bookstores on Oct. 15, Mr. Iacocca's 60th birthday.

But Ford Motor Co. put the Iacocca-Ford vendetta behind it with a surprisingly orderly transition in top management: Effective Feb. 1, 1985, Chairman Philip Caldwell will retire and be replaced by Donald E. Petersen, who's now Ford's president. Mr. Petersen will be succeeded as president by Harold A. (Red) Poling, who's presently vice president of Ford's North American

Automakers Kept Busy In 1984

Retail Sales of U.S.-Produced Passenger Cars

	AMC	Chrysler	Ford	General Motors	Honda	Volkswagen
1st Qtr.	49,501	239,089	487,929	1,188,081	29,086	20,933
2nd Qtr.	46,755	274,105	821,257	1,350,105	36,574	22,984
3rd Qtr.	54,733	227,957	462,824	1,051,713	32,506	17,804
4th Qtr.*	41,000	250,000	500,000	1,000,000	35,000	22,000

Source: IFMA
*Estimate



went on. And it was just as well, said many economists. That hot early pace was opening the door to inflation and to a shortened, burned-out economic recovery.

But as growth continued at a more moderate pace after the first period, one component of the economy—business capital investment—continued on like gangbusters.

In the opening period when the economy grew at a 10.1 pct annual rate, business investment grew at a 20.6 clip. In the sec-

ond quarter, the economy grew by 7.1 pct; investment by 21.3 pct. In the third period, the economy expanded at 1.9 pct and investment by 15.9 pct.

That relationship probably will have held fast when final data on the closing quarter is known.

streamline GM but also will continue seeking business outside the auto industry. At the time of the acquisition, 40 pct of EDS' business was health care and insurance; 33 pct commercial; and 27 pct government services.

Chrysler Chairman Lee

automotive operations.

The entire U.S. auto industry likely will announce a record-breaking \$9 billion combined profit for 1984. American Motors will contribute a profit of some \$10-14 million—its first profit since 1979.

METAL PRICES AND PRODUCTION

World Steel Production

Raw steel, thousands of metric tons

	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984*
Argentina	2,353	2,208	2,410	2,684	2,786	3,199	2,687	2,541	2,900	2,900	2,597
Australia	7,813	7,889	7,794	7,336	7,596	8,119	7,589	7,635	6,400	5,600	6,200
Austria	4,699	4,069	4,478	4,093	4,335	4,917	4,623	4,656	4,300	4,400	4,860
Belgium	16,227	11,582	12,145	11,256	12,601	13,442	12,322	12,263	10,000	10,200	11,228
Brazil	7,515	8,387	9,253	11,253	12,205	13,893	15,309	13,213	13,000	14,700	18,260
Bulgaria	2,188	2,265	2,490	2,589	2,469	2,482	2,567	2,482	2,600	2,900	3,260
Canada	13,623	13,025	13,290	13,631	14,899	16,054	15,901	14,811	11,900	12,800	14,836
China*	21,119	23,903	20,459	23,740	31,780	34,484	37,121	35,600	37,100	36,900	44,840
Czechoslovakia*	13,640	14,324	14,693	15,054	15,294	14,817	14,925	14,270	15,000	15,000	16,860
France	27,021	21,531	23,227	22,094	22,844	23,380	23,176	21,261	18,400	17,600	18,748
W. Germany	53,232	40,412	42,413	38,984	41,253	46,040	43,838	41,610	35,900	35,700	39,536
E. Germany*	6,105	6,480	6,740	6,850	6,976	7,024	7,308	7,467	7,200	7,200	8,093
Hungary*	3,468	3,671	3,652	3,723	3,773	3,907	3,767	3,645	3,700	3,700	4,159
India	7,068	7,991	9,364	10,009	10,099	10,126	9,514	10,780	11,000	10,200	10,520
Italy	23,804	21,865	23,455	23,335	24,283	24,250	25,501	24,777	24,000	21,800	23,992
Japan	117,131	102,313	107,399	102,405	102,105	111,748	111,395	101,576	99,500	97,200	104,896
S. Korea*	2,900	2,900	3,000	4,000	5,080	5,400	5,800	5,500	5,800	5,900	6,632
N. Korea	1,947	1,994	3,515	4,347	4,969	7,610	8,558	10,753	11,800	11,900	12,936
Luxembourg	6,447	4,624	4,565	4,329	4,790	4,949	4,618	3,791	3,500	3,300	3,928
Mexico	5,138	5,272	5,298	5,601	6,711	7,005	7,099	7,605	7,100	6,900	7,460
Netherlands	5,837	4,817	5,178	4,923	5,583	5,806	5,264	5,464	4,400	4,500	5,708
Poland*	14,556	15,007	15,640	17,841	19,251	19,218	19,485	15,719	14,800	16,400	18,434
Rumania*	8,840	9,549	10,970	11,457	11,780	12,909	13,175	13,025	13,100	13,500	15,174
South Africa	5,839	6,831	7,108	7,295	7,902	8,878	9,068	9,004	8,200	7,000	7,432
Spain	11,502	11,102	10,982	11,169	11,339	12,248	12,672	12,919	13,200	12,700	13,276
Sweden	5,988	5,611	5,139	3,968	4,327	4,700	4,237	3,770	3,900	4,200	4,464
U.K.	22,384	19,773	22,396	20,467	20,367	21,523	11,342	15,573	13,700	15,000	15,172
U.S.S.R.*	136,200	141,325	144,805	146,655	151,400	149,087	147,931	148,517	147,200	152,500	171,410
U.S.	132,195	105,816	116,120	114,700	124,002	123,276	101,696	108,782	67,600	75,600	91,131
Yugoslavia*	2,836	2,916	2,751	3,182	3,456	3,535	3,634	2,977	3,800	4,100	3,712
Others*	13,790	13,548	14,970	17,672	21,061	24,612	25,748	22,749	24,300	27,300	30,685
Total	709,783	642,080	675,511	675,635	717,159	746,448	715,018	706,856	645,200	682,600	740,447

*Estimates. Source: International Iron and Steel Institute.

U.S. Yearly Raw Steel Production†

Net Tons

	Openhearth	Basic Oxygen Process	Resamers**	Electric*	
	Production	Percent of Total Output	Production	Percent of Total Output	Production
1953	100,473,823	100.0	---	---	3,855,705
1954	100,327,434	99.0	---	---	2,584,104
1955	105,359,417	90.0	307,279	---	3,319,517
1956	102,840,585	89.2	506,336	---	3,227,997
1957	101,657,776	90.2	611,508	---	2,475,138
1958	75,879,394	89.0	1,323,361	1.5	1,395,985
1959	81,668,967	87.3	1,864,338	2.0	1,380,283
1960	96,387,506	87.0	3,346,150	3.3	1,189,196
1961	84,502,071	86.2	3,967,156	4.0	881,060
1962	82,957,319	84.8	5,552,897	5.2	804,964
1963	85,833,925	81.3	8,544,078	7.8	962,659
1964	98,087,499	77.2	15,442,186	12.2	857,586
1965	94,193,225	71.7	22,878,605	17.4	585,965
1966	85,024,572	63.4	33,928,374	25.4	278,119
1967	70,680,028	55.6	41,434,350	32.5	---
1968	65,836,000	50.1	48,812,000	37.2	---
1969	60,884,041	43.1	60,235,871	42.7	---
1970	49,022,000	36.6	63,330,000	48.2	---
1971	35,556,000	29.5	63,943,000	53.1	---
1972	34,936,000	28.2	74,584,000	56.0	---
1973	39,780,000	28.4	83,280,000	55.2	---
1974	35,488,000	24.3	81,552,000	56.0	---
1975	22,161,000	19.1	71,801,000	61.5	---
1976	23,470,000	18.3	79,818,000	62.4	---
1977	20,043,000	16.0	77,408,000	61.8	---
1978	21,310,000	15.5	83,484,000	61.0	---
1979	19,158,000	14.0	83,256,000	61.0	---
1980	13,054,000	11.7	67,615,000	60.4	---
1981	13,452,000	11.1	73,231,000	60.6	---
1982	6,110,000	8.2	45,308,000	60.7	---
1983	5,951,000	7.0	52,050,000	61.5	---
1984††	5,923,000	6.5	56,046,000	61.5	---
1975	22,680,000	19.4	71,801,000	61.5	---
1976	24,612,000	19.3	79,818,000	62.4	---
1977	27,882,000	22.2	77,408,000	61.8	---
1978	32,287,000	23.5	83,484,000	61.0	---
1979	33,927,000	23.0	83,256,000	61.0	---
1980	31,166,000	22.9	67,615,000	60.4	---
1981	34,145,000	27.3	73,231,000	60.6	---
1982	23,158,000	31.1	45,308,000	60.7	---
1983	26,615,000	31.5	52,050,000	61.5	---
1984††	29,162,000	32.0	56,046,000	61.5	---

*Includes very small tonnages of crucible steel. ††IRON AGE estimate. Source: AISI.

**Included in openhearth since 1968. †Steel in first solid state after melting suitable for further processing or sale, including ingots, steel castings and strand or pressure cast blooms, billets, slabs, or other product forms.

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U.S. Monthly Raw Steel Production, Net Tons

	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Jan.	9,317,385	12,049,404	6,416,004	10,352,748	8,390,914	9,526,000	11,830,488	10,577,000	10,833,000	12,611,589	11,083,447	11,242,855	11,273,740				
Feb.	9,602,939	11,126,808	6,236,068	9,698,316	8,222,352	9,485,358	10,885,888	10,248,000	10,041,000	11,794,888	10,915,021	11,488,388	10,874,377				
Mar.	11,567,745	11,564,683	7,086,369	10,563,943	10,080,014	10,496,987	12,346,963	12,083,000	10,963,000	12,721,053	12,400,575	11,885,581	12,845,281				
Apr.	11,281,920	9,777,857	7,584,687	9,235,881	10,095,362	10,560,851	11,986,162	11,570,000	10,349,000	12,450,040	12,142,751	11,385,675	12,564,888				
May	11,800,581	8,830,472	8,980,826	7,535,508	11,489,520	11,080,357	12,012,449	12,191,000	10,577,000	12,700,325	12,350,384	11,574,485	12,920,415				
June	10,907,634	7,404,873	8,551,856	8,691,785	10,385,154	10,184,634	11,593,450	11,403,000	9,576,000	11,905,936	11,810,267	11,323,086	11,480,888				
July	5,227,129	6,350,924	8,091,956	6,174,187	8,653,544	10,105,600	11,550,988	10,791,000	9,020,000	11,452,388	11,385,146	10,790,980	8,942,394				
Aug.	1,439,277	6,836,000	8,660,527	7,097,916	7,781,580	10,515,258	11,324,149	11,097,000	10,300,000	8,955,712	11,420,985	10,794,739	5,773,738				
Sept.	1,535,017	6,458,421	8,904,900	7,251,023	7,856,000	10,666,978	9,549,355	11,280,000	10,438,000	8,085,770	11,523,106	10,726,618	7,678,110				
Oct.	1,704,533	6,866,380	9,173,170	7,780,536	8,463,180	11,566,246	9,235,826	11,509,600	11,171,000	9,006,237	12,323,544	10,696,729	8,211,088				
Nov.	7,267,807	8,171,940	8,745,986	7,846,057	8,498,239	11,292,070	8,822,186	10,987,000	11,299,000	9,586,080	11,916,395	10,009,000	8,053,140				
Dec.	11,999,319	5,839,841	9,568,954	8,079,865	8,753,117	11,611,808	9,627,156	10,435,000	11,853,000	10,421,000	11,612,087	10,438,000	8,763,888				
Total	93,446,132	99,281,901	98,014,482	98,327,785	108,290,949	127,075,767	131,461,001	134,191,000	127,213,000	131,462,000	141,581,000	131,814,000	138,442,888				
	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
Jan.	10,001,026	12,372,862	12,726,000	11,584,190	9,834,725	9,009,254	10,301,277	11,104,828	10,700,736	10,590,135	7,737,388	5,570,000	7,970,000				
Feb.	9,979,752	11,625,734	11,598,000	10,861,863	9,906,523	8,858,888	9,843,242	10,582,363	10,331,888	10,026,344	7,177,979	5,676,000	8,142,000				
Mar.	11,567,946	13,068,378	12,758,000	11,980,244	11,294,279	11,049,226	11,082,583	12,575,987	11,436,944	11,744,378	8,048,621	7,127,000	9,056,000				
Apr.	11,587,706	12,788,829	12,442,000	10,667,492	11,436,185	11,165,557	11,528,367	12,195,812	10,858,282	11,242,726	7,005,717	7,392,000	8,987,000				
May	11,936,558	13,174,066	12,752,000	9,863,557	12,136,009	12,200,852	12,320,388	12,788,673	9,225,991	11,422,988	6,678,457	7,412,000	9,174,000				
June	10,979,970	12,487,656	12,185,000	8,743,842	11,604,506	11,363,812	11,880,523	12,229,980	7,500,772	10,451,384	8,050,082	6,089,000	7,945,000				
July	10,341,230	12,290,250	12,155,000	8,370,426	11,398,951	10,319,277	11,367,671	11,821,349	8,796,728	10,159,544	5,718,017	6,021,000	7,400,000				
Aug.	10,842,279	12,181,330	11,837,000	8,648,260	11,128,102	10,392,460	11,549,515	11,309,403	7,018,547	10,120,254	5,537,070	7,000,000	8,915,000				
Sept.	10,912,540	12,229,006	11,849,000	9,256,321	10,462,577	10,050,311	11,467,224	10,541,320	7,786,905	9,018,072	5,299,622	7,134,000	8,378,000				
Oct.	11,656,841	12,875,791	12,817,045	9,213,736	10,278,000	10,442,000	12,105,000	10,809,989	9,442,103	9,002,756	5,282,370	7,682,000	7,943,000				
Nov.	11,398,316	12,586,509	11,614,000	8,709,090	9,494,000	9,748,000	11,854,000	9,907,000	10,057,000	7,932,000	4,546,000	7,253,000	8,507,000				
Dec.	11,878,199	12,721,577	10,980,000	8,845,511	9,215,000	10,031,000	11,812,000	9,986,000	10,180,000	7,871,000	4,456,000	6,991,000	5,543,000				
Total	133,241,105	150,788,827	148,720,000	116,783,332	128,900,000	129,333,000	137,031,000	136,341,000	111,835,000	128,828,000	74,877,000	84,818,000	91,131,000				

* Estimate. † Steel in first solid state after melting suitable for further processing or sale, including ingots, steel castings and continuous or pressure cast blooms, billets, slabs, or other product forms. Source: AISI

U.S. Raw Steel Production, Rate of Capability Utilization

	1965†	1967	1968	1969	1970	1971	1972	1973	1974	1975††	1976	1977	1978	1979	1980	1981	1982	1983	1984
Jan.	97.9	98.4	111.2	102.6	104.1	104.3	92.6	114.5	117.8	90.4	74.4	66.8	77.2	65.5	82.7	79.9	59.3	43.4	66.9
Feb.	105.0	102.9	118.7	111.6	107.6	111.4	96.7	119.1	118.8	93.8	80.1	72.1	80.1	67.9	85.3	83.7	68.9	46.0	76.9
Mar.	111.8	101.5	117.7	114.8	110.0	117.0	107.3	121.1	118.1	93.4	85.4	81.2	83.1	69.9	86.4	88.8	67.7	55.5	78.1
Apr.	110.6	99.0	119.1	116.1	108.9	120.2	110.8	122.3	119.0	84.9	88.4	83.3	86.5	83.4	83.0	87.7	55.2	58.9	80.8
May	112.8	97.9	117.5	114.4	107.1	118.6	110.5	121.9	118.0	75.9	90.8	88.1	91.5	94.8	88.8	86.2	50.9	57.9	76.8
June	109.1	91.6	113.9	113.0	108.3	106.9	105.0	119.4	116.5	86.6	86.7	84.9	91.1	93.7	88.4	81.5	47.7	56.5	71.4
July	99.9	89.0	106.0	105.2	99.8	92.0	95.7	113.8	112.5	85.1	84.8	76.7	85.1	89.2	83.1	77.8	43.8	54.3	65.3
Aug.	102.7	95.3	82.9	105.7	99.6	53.4	100.4	112.7	109.6	67.3	82.8	77.2	86.3	86.0	84.8	77.3	42.8	35.1	68.5
Sept.	107.9	99.8	77.3	110.2	102.6	73.4	104.4	117.0	113.3	74.7	80.4	77.2	88.6	82.8	82.7	73.9	41.8	37.8	57.7
Oct.	106.5	103.4	83.4	114.1	99.0	78.0	107.9	119.2	118.6	86.0	73.8	77.7	88.1	14.4	72.3	88.7	40.2	60.2	48.7*
Nov.	104.1	108.1	91.7	114.0	95.7	77.0	106.0	120.4	111.1	87.4	72.2	75.0	85.4	80.6	75.5	82.8	36.9	58.7	48.4*
Dec.	96.6	110.6	96.5	108.3	96.6	81.3	106.9	117.7	101.4	86.2	67.8	74.7	87.7	78.0	77.8	77.8	34.0	54.7	45.1*
Average	105.6	100.8	103.1	111.0	103.4	94.7	104.5	118.5	114.5	70.2	80.9	78.4	88.8	87.8	72.8	78.3	48.4	56.2	65.3*

* Estimate. † Production Index 1967 = 100, revised back to 1965 in Jan. 1971. †† Rate of Capability Utilization, begun January, 1976, revised back to January, 1975. Source: AISI

STEEL PRICES

Composite Prices by Periods

Period	Cents per Pound
April 17, 1978 to July 31, 1978	17.870
Jan. 31, 1979 to Dec. 31, 1979	18.719
Jan. 1, 1979 to April 1, 1979	19.549
April 1, 1979 to May 13, 1979	19.606
May 13, 1979 to July 1, 1979	19.688
July 1, 1979 to July 8, 1979	20.095
July 9, 1979 to Oct. 1, 1979	20.311
Oct. 1, 1979 to Jan. 6, 1980	20.547
Jan. 7, 1980 to Mar. 1, 1980	21.038
Mar. 2, 1980 to Mar. 9, 1980	21.130
Mar. 10, 1980 to Mar. 31, 1980	21.180
April 1, 1980 to July 6, 1980	21.739
July 7, 1980 to Oct. 4, 1980	21.736
Oct. 5, 1980 to Nov. 30, 1980	22.019
Dec. 1, 1980 to Dec. 31, 1980	22.286
Jan. 1, 1981 to Feb. 1, 1981	22.901
Feb. 2, 1981 to Feb. 28, 1981	23.382
Mar. 1, 1981 to Mar. 28, 1981	23.508
Mar. 29, 1981 to June 20, 1981	23.776
June 21, 1981 to Sept. 26, 1981	24.488
Sept. 27, 1981 to April 3, 1982	25.195
April 4, 1982 to Feb. 5, 1983	25.297
Feb. 6, 1983 to Feb. 13, 1983	25.954
Feb. 14, 1983 to Aug. 31, 1983	26.217
Sept. 1, 1983 to Feb. 12, 1984	26.822
Feb. 13, 1984 to May 13, 1984	26.939
May 14, 1984 to July 15, 1984	27.405
July 16, 1984 to Dec. 31, 1984	27.982

The Iron Age Finished Steel Composite Price

	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984
January	6.308	6.388	6.445	6.545	6.794	7.263	7.838	9.014	9.389	9.389	9.488									
February	6.308	6.388	6.448	6.545	6.904	7.351	7.838	8.986	9.389	9.389	9.488									
March	6.308	6.383	6.448	6.545	6.961	7.434	8.012	8.986	9.389	9.389	9.488									
April	6.308	6.383	6.448	6.545	6.961	7.504	8.055	8.986	9.389	9.389	9.488									
May	6.308	6.383	6.448	6.545	7.042	7.580	8.055	8.986	9.389	9.389	9.488									
June	6.308	6.376	6.448	6.545	7.042	7.813	8.294	8.986	9.389	9.389	9.488									
July	6.308	6.376	6.448	6.545	7.125	7.813	8.480	8.986	9.389	9.389	9.488									
August	6.308	6.376	6.448	6.707	7.252	7.813	8.728	8.986	9.389	9.389	9.488									
September	6.308	6.423	6.485	6.757	7.252	7.813	8.977	8.986	9.389	9.389	9.488									
October	6.308	6.445	6.486	6.757	7.252	7.813	8.977	8.986	9.389	9.389	9.488									
November	6.308	6.445	6.486	6.757	7.252	7.813	8.977	8.986	9.389	9.389	9.488									

STATISTICAL REVIEW

Galvanized Sheets At Pittsburgh, Cents Per Pound

	1973	1974	1975	1976	1977	1978
Jan.	10.525	10.80	14.05	15.40	17.40	18.60
Feb.	10.525	10.80	14.05	15.40	17.40	18.60
Mar.	10.525	10.80	14.05	15.40	17.40	18.60
Apr.	10.525	10.80	14.05	15.40	17.40	18.60
May	10.525	12.15	14.05	15.40	17.40	20.075
June	10.525	12.15	14.05	16.40	17.40	20.075
July	10.525	14.05	14.05	16.40	18.60	20.075
Aug.	10.525	14.05	14.05	16.40	18.60	20.075
Sept.	10.525	14.05	14.05	16.40	18.60	20.075
Oct.	10.525	14.05	14.05	16.40	18.60	20.075
Nov.	10.525	14.05	14.05	16.40	18.60	20.075
Dec.	10.525	14.05	14.05	16.40	18.60	20.075
Average	10.59	12.65	14.39	16.07	18.00	20.18

	1979	1980	1981	1982	1983	1984
Jan.	21.95	22.85	25.25	26.25	28.25	30.30
Feb.	21.95	22.85	25.25	26.25	28.25	30.30
Mar.	21.95	22.85	25.25	26.25	28.25	30.30
Apr.	21.95	23.80	25.25	26.25	28.25	30.30
May	21.95	23.80	25.25	26.25	28.25	30.30
June	21.95	23.80	26.25	26.25	28.25	30.30
July	21.95	23.80	27.15	26.25	28.25	30.30
Aug.	22.85	23.80	27.15	26.25	28.25	30.30
Sept.	22.85	23.80	27.15	26.25	28.25	30.30
Oct.	22.85	23.80	27.15	26.25	28.25	30.30
Nov.	22.85	23.80	27.15	26.25	28.25	30.30
Dec.	22.85	23.80	27.15	26.25	28.25	30.30
Average	22.32	23.56	26.30	26.25	28.62	30.30

†Hot-Dipped, 10 ga.

Structural Steel Shapes At Pittsburgh, Cents Per Pound

	1979	1980	1981	1982	1983	1984
Jan.	17.00	18.00	19.90	22.90	23.90	23.90
Feb.	17.00	18.00	19.90	22.90	23.90	23.90
Mar.	17.00	18.00	19.90	22.90	23.90	23.90
Apr.	17.00	18.00	21.65	23.90	23.90	23.90
May	17.00	18.00	21.65	23.90	23.90	23.90
June	17.00	18.00	21.65	23.90	23.90	23.90
July	17.00	18.00	21.65	23.90	23.90	23.90
Aug.	17.00	18.00	21.65	23.90	23.90	23.90
Sept.	17.00	18.00	21.65	23.90	23.90	23.90
Oct.	17.00	18.00	21.65	23.90	23.90	23.90
Nov.	17.00	18.00	21.65	23.90	23.90	23.90
Dec.	17.00	18.00	21.65	23.90	23.90	23.90
Average	17.36	19.00	21.52	23.65	23.90	23.90

Special Quality Bars At Pittsburgh, Cents Per Pound

	1979	1980	1981	1982	1983	1984
Jan.	19.10	21.00	22.80	23.95	25.80	25.80
Feb.	19.10	21.00	22.80	23.95	25.80	25.80
Mar.	19.10	21.00	22.80	23.95	25.80	25.80
Apr.	19.10	21.00	22.80	23.95	25.80	25.80
May	19.10	21.00	22.80	23.95	25.80	25.80
June	19.10	21.00	23.95	23.95	25.80	25.80
July	19.10	21.00	23.95	23.95	25.80	27.05
Aug.	19.85	21.00	23.95	23.95	25.80	27.05
Sept.	19.85	21.00	23.95	23.95	25.80	27.05
Oct.	19.85	21.00	23.95	23.95	25.80	27.05
Nov.	19.85	22.80	23.95	23.95	25.80	27.05
Dec.	19.85	22.80	23.95	23.95	25.80	27.05
Average	19.41	21.30	23.29	23.95	25.65	26.43

Steel Plates At Pittsburgh, Cents Per Pound

	1979	1980	1981	1982	1983	1984
Jan.	17.85	19.45	21.50	24.25	24.25	25.75
Feb.	17.85	19.45	21.50	24.25	25.75	25.75
Mar.	17.85	19.45	23.25	24.25	25.75	25.75
Apr.	17.85	20.70	23.25	24.25	25.75	25.75
May	18.17	20.70	23.25	24.25	25.75	25.75
June	18.50	20.70	23.25	24.25	25.75	25.75
July	18.50	20.70	23.25	24.25	25.75	25.75
Aug.	18.50	20.70	23.25	24.25	25.75	25.75
Sept.	18.50	20.70	23.25	24.25	25.75	25.75
Oct.	19.45	21.50	24.25	24.25	25.75	25.75
Nov.	19.45	21.50	24.25	24.25	25.75	25.75
Dec.	19.45	21.50	24.25	24.25	25.75	25.75
Average	18.49	20.82	23.20	24.25	25.63	25.75

Hot-Rolled Sheets At Pittsburgh, Cents Per Pound

	1973	1974	1975	1976	1977	1978
Jan.	8.35	8.55	11.00	11.70	13.25	14.175
Feb.	8.35	8.55	11.00	11.70	13.25	14.175
Mar.	8.35	8.55	11.00	11.70	13.25	14.175
Apr.	8.35	8.55	11.00	11.70	13.25	14.175
May	8.35	9.55	11.00	11.70	13.25	15.275
June	8.35	9.55	11.00	11.70	13.25	15.275
July	8.35	11.00	11.00	12.45	14.175	15.275
Aug.	8.35	11.00	11.00	12.45	14.175	15.275
Sept.	8.35	11.00	11.00	12.45	14.175	15.275
Oct.	8.55	11.00	11.70	12.45	14.175	15.80
Nov.	8.55	11.00	11.70	12.45	14.175	15.80
Dec.	8.55	11.00	11.70	12.45	14.175	15.80
Average	8.40	9.94	11.17	12.14	13.712	15.12

	1979	1980	1981	1982	1983	1984
Jan.	16.60	17.50	19.50	20.80	20.80	23.75
Feb.	16.60	17.50	19.50	20.80	22.05	23.75
Mar.	16.60	17.50	19.50	20.80	22.05	23.75
Apr.	16.60	18.45	19.50	20.80	22.05	23.75
May	16.60	18.45	19.50	20.80	22.05	23.75
June	16.60	18.45	20.15	20.80	22.05	23.75
July	16.60	18.45	20.80	20.80	22.05	23.75
Aug.	17.50	18.45	20.80	20.80	22.05	23.75
Sept.	17.50	18.45	20.80	20.80	23.75	23.75
Oct.	17.50	18.45	20.80	20.80	23.75	23.75
Nov.	17.50	18.45	20.80	20.80	23.75	23.75
Dec.	17.50	18.45	20.80	20.80	23.75	23.75
Average	16.97	18.21	20.20	20.80	22.51	23.75

Hot-Rolled Strip At Pittsburgh, Cents Per Pound

	1973	1974	1975	1976	1977	1978
Jan.	8.15	8.375	11.00	11.70	13.25	14.175
Feb.	8.15	8.375	11.00	11.70	13.25	14.175
Mar.	8.15	8.375	11.00	11.70	13.25	14.175
Apr.	8.15	8.375	11.00	11.70	13.25	14.175
May	8.15	9.50	11.00	11.70	13.25	15.275
June	8.15	9.50	11.00	11.70	13.25	15.275
July	8.15	11.00	11.00	12.45	14.175	15.275
Aug.	8.15	11.00	11.00	12.45	14.175	15.275
Sept.	8.15	11.00	11.00	12.45	14.175	15.275
Oct.	8.375	11.00	11.70	12.45	14.175	15.80
Nov.	8.375	11.00	11.70	12.45	14.175	15.80
Dec.	8.375	11.00	11.70	12.45	14.175	15.80
Average	8.206	9.875	11.17	12.15	13.70	14.79

	1979	1980	1981	1982	1983	1984
Jan.	16.60	17.50	19.50	20.80	20.80	23.75
Feb.	16.60	17.50	19.50	20.80	22.05	23.75
Mar.	16.60	17.50	19.50	20.80	22.05	23.75
Apr.	16.60	18.45	19.50	20.80	22.05	23.75
May	16.60	18.45	19.50	20.80	22.05	23.75
June	16.60	18.45	20.15	20.80	22.05	23.75
July	16.60	18.45	20.80	20.80	22.05	23.75
Aug.	17.50	18.45	20.80	20.80	22.05	23.75
Sept.	17.50	18.45	20.80	20.80	23.75	23.75
Oct.	17.50	18.45	20.80	20.80	23.75	23.75
Nov.	17.50	18.45	20.80	20.80	23.75	23.75
Dec.	17.50	18.45	20.80	20.80	23.75	23.75
Average	16.97	18.21	20.20	20.80	22.51	23.75

IRON ORE

Pig Iron, Production Net Tons

Year	Basic	Acid	Low Phosphorus	Foundry	Malleable	All Other, incl. Direct Castings	Pig Iron
1973	96,202,000	1,242,000	101,000	1,581,000	1,352,000	359,000	100,837,000
1974	91,193,000	1,100,000	106,000	1,528,000	1,382,000	600,000	95,309,000
1975	75,911,000	1,087,000	140,000	1,321,000	814,000	650,000	79,193,000
1976	82,894,000	1,150,000	112,000	1,489,000	800,000	425,000	86,064,000
1977	78,198,000	254,000	122,000	1,610,000	690,000	454,000	81,328,000
1978	84,497,000	295,000	110,000	1,856,000	471,000	450,000	87,679,000
1979	84,047,000	12,000	178,000	1,457,000	1,003,000	308,000	87,003,000
1980	66,964,000	39,000	72,000	713,000	799,000	134,000	68,771,000
1981	71,166,000	56,000	132,000	1,221,000	929,000	66,000	73,750,000
1982	42,604,000	—	56,000	239,000	377,000	—	43,066,000
1983	48,132,000	—	27,000	130,000	417,000	—	48,706,000
1984*	53,566,000	—	30,000	144,000	464,000	—	54,204,000

*Iron Age estimate.

Source: AISI

Cold-Rolled Sheets At Pittsburgh, Cents Per Pound

	1973	1974	1975	1976	1977	1978
Jan.	10.075	10.30	13.00	13.90	15.80	16.90
Feb.	10.075	10.30	13.00	13.90	15.80	16.90
Mar.	10.075	10.30	13.00	13.90	15.80	16.90
Apr.	10.075	10.30	13.00	13.90	15.80	16.90
May	10.075	11.30	13.00	13.90	15.80	18.175
June	10.075	11.30	13.00	13.90	15.80	18.175
July	10.075	13.00	13.00	14.80	16.90	18.175
Aug.	10.075	13.00	13.00	14.80	16.90	18.175
Sept.	10.075	13.00	13.00	14.80	16.90	18.175
Oct.	10.30	13.00	13.90	14.80	16.90	18.80
Nov.	10.30	13.00	13.90	14.80	16.90	18.80
Dec.	10.30	13.00	13.90	14.80	16.90	18.80
Average	10.13	11.81	13.23	14.43	16.35	17.17

	1979	1980	1981	1982	1983	1984
Jan.	19.75	20.75	23.15	24.65	24.65	28.15
Feb.	19.75	20.75	23.15	24.65	26.15	28.15</

U.S. Iron Ore Supply

Year	Domestic Shipments	Exports	Imports	Net Supply*
1975	75,682,787***	2,323,235	46,742,190	119,887,526
1976	76,726,254***	2,913,309	44,389,538	118,202,483
1977	54,315,852***	2,143,047	27,904,705	90,077,510
1978	82,611,422***	4,213,194	33,616,378	112,014,606
1979	86,052,903***	5,147,657	33,776,072	114,681,318
1980	68,527,008***	5,089,196	25,058,200	87,896,010
1981	71,369,926	5,545,518	28,333,974	94,158,382
1982	35,864,871	3,177,620	14,715,345	47,402,596
1983	45,033,892	3,781,244	13,327,905	54,580,553
1984**	50,888,000	3,500,000	14,100,000	62,488,000

*Domestic shipments minus exports, plus imports. **Estimate

***Includes by-product ore

Source: American Iron Ore Assn

SCRAP COMPOSITES

Average of Iron Age Scrap Prices Pittsburgh, Chicago, Philadelphia, Per Gross Ton

No. 1 Heavy Melt

	1979	1980	1981	1982	1983	1984
Jan	\$ 97.56	\$ 99.67	\$ 98.58	\$84.34	\$81.30	\$93.56
Feb	110.75	105.00	99.50	86.17	70.00	94.91
Mar	119.75	101.17	105.23	76.83	73.09	91.25
Apr	96.50	92.25	101.75	71.33	71.60	90.16
May	97.75	77.50	95.42	62.67	67.70	89.08
June	100.83	69.70	89.37	58.03	70.34	85.16
July	96.10	76.08	90.17	56.00	71.75	82.03
Aug	90.33	84.42	94.63	55.69	75.04	82.25
Sept	88.08	94.43	90.42	56.17	77.17	85.00
Oct	67.30	95.91	81.17	52.92	77.97	82.90
Nov	92.00	98.50	75.63	51.23	81.42	80.25*
Dec	94.10	101.57	78.42	52.59	87.25	81.03*
Average	97.91	91.35	91.53	63.35	73.71	86.46*

No. 2 Bundles

	1979	1980	1981	1982	1983	1984
Jan	\$61.56	\$62.50	\$71.83	\$56.50	\$42.84	\$59.96
Feb	68.17	67.41	71.83	56.17	48.84	62.50
Mar	73.25	65.90	73.83	51.23	51.84	62.41
Apr	63.43	60.83	75.08	47.58	48.98	61.03
May	65.75	53.83	68.08	44.83	46.57	60.16
June	67.50	50.70	61.57	42.83	46.34	56.50
July	62.76	54.00	61.58	41.83	45.75	51.10
Aug	58.58	62.66	62.50	41.83	45.50	51.16
Sept	57.41	67.90	61.66	41.47	45.50	51.83
Oct	56.76	70.91	56.50	39.42	46.57	51.16
Nov	58.58	72.75	53.43	36.70	49.34	50.50*
Dec	61.03	75.23	53.75	36.75	56.91	50.73*
Average	62.89	63.71	64.37	45.07	48.15	55.75*

Chicago

Prices of No. 1 Heavy Melt, Per Gross Ton

	1979	1980	1981	1982	1983	1984
Jan	\$ 98.30	\$ 96.50	\$ 95.50	\$83.25	\$62.70	\$82.10
Feb	109.75	100.50	101.25	79.50	74.25	90.50
Mar	121.25	96.50	108.10	71.70	77.50	87.50
Apr	98.30	96.00	104.50	67.00	72.50	85.50
May	99.75	70.50	96.75	58.50	68.30	85.50
June	104.00	63.50	88.50	52.30	71.50	80.50
July	96.90	67.50	88.50	49.50	72.25	77.50
Aug	88.25	77.50	97.50	50.70	76.90	78.50
Sept	86.50	88.50	91.25	51.50	79.50	81.50
Oct	87.30	93.75	81.00	46.50	79.50	80.90
Nov	94.50	98.75	75.50	46.50	80.75	84.75*
Dec	93.90	105.10	75.50	49.50	84.75	83.60*
Average	98.30	87.05	91.99	58.87	75.03	84.02

No. 2 Bundles

	1979	1980	1981	1982	1983	1984
Jan	\$64.50	\$54.50	\$77.00	\$65.50	\$44.90	\$60.70
Feb	67.50	58.50	80.25	62.50	50.75	64.00
Mar	68.75	57.50	83.70	56.50	54.50	64.50
Apr	59.90	53.25	83.25	52.50	49.50	64.50
May	63.00	49.50	73.25	47.50	44.50	64.50
June	61.50	48.30	64.50	43.90	44.50	59.50
July	53.50	51.50	65.75	41.50	44.50	49.50
Aug	49.50	61.50	68.70	41.50	44.50	49.50
Sept	50.25	72.10	68.00	41.50	44.50	51.50
Oct	52.50	61.75	60.50	38.50	44.50	51.50
Nov	56.50	87.50	60.50	38.50	45.75	53.00*
Dec	57.30	86.50	63.25	39.25	58.25	53.40*
Average	58.72	63.24	70.81	47.43	47.38	57.17

IRON AGE/JANUARY 4, 1985

Pittsburgh

Prices of No. 1 Heavy Melt, Per Gross Ton

	1979	1980	1981	1982	1983	1984
Jan	\$ 93.30	\$102.00	\$104.50	\$94.50	\$63.90	\$ 98.30
Feb	111.75	106.50	105.75	91.50	73.25	103.25
Mar	127.75	105.50	116.10	85.90	78.25	100.50
Apr	102.90	98.00	116.75	75.50	75.50	100.50
May	102.75	79.50	105.10	64.50	69.10	99.75
June	105.50	69.50	100.00	61.50	72.50	94.50
July	99.90	77.75	102.50	59.00	74.50	88.10
Aug	93.50	87.50	107.10	57.50	79.70	87.25
Sept	89.25	102.90	101.50	57.50	82.50	92.00
Oct	87.30	102.50	93.00	55.25	82.90	87.70
Nov	94.50	105.25	84.90	52.50	85.50	81.50*
Dec	95.70	103.10	87.25	53.75	92.00	83.40*
Average	100.34	95.00	101.54	67.41	77.46	93.06

No. 2 Bundles

	1979	1980	1981	1982	1983	1984
Jan	\$60.10	\$61.00	\$74.50	\$60.50	\$43.10	\$59.50
Feb	70.50	67.50	74.50	62.50	50.75	59.50
Mar	78.75	68.70	77.30	53.70	54.50	59.50
Apr	67.70	64.50	81.50	48.75	51.50	59.50
May	69.75	58.75	73.50	46.50	51.50	59.50
June	74.50	52.70	65.70	44.50	51.50	59.50
July	66.30	54.50	64.50	44.50	51.50	54.30
Aug	64.75	63.50	64.50	44.50	51.50	53.50
Sept	62.75	66.50	64.50	42.50	51.50	53.50
Oct	56.30	66.50	63.00	40.25	51.50	53.10
Nov	59.25	69.75	60.50	38.10	52.75	52.50*
Dec	59.50	73.90	60.50	37.50	59.50	53.30*
Average	66.26	63.98	68.71	46.98	51.75	56.43

*Estimate

Philadelphia

Prices of No. 1 Heavy Melt, Per Gross Ton

	1979	1980	1981	1982	1983	1984
Jan	\$101.10	\$100.50	\$85.75	\$75.25	\$57.50	\$ 90.30
Feb	110.75	108.00	91.50	75.50	62.50	91.00
Mar	110.25	101.50	91.50	72.90	63.50	85.75
Apr	97.70	92.75	90.00	71.50	65.00	84.50
May	90.75	82.50	84.50	65.00	65.70	82.00
June	93.08	76.10	79.50	60.30	68.50	80.50
July	91.50	83.00	79.50	59.50	68.50	80.50
Aug	89.25	86.25	79.30	59.50	68.50	81.00
Sept	88.50	91.90	78.50	59.50	68.50	81.50
Oct	87.30	91.50	89.50	57.00	71.50	80.10
Nov	88.50	91.50	66.50	54.70	78.00	74.50*
Dec	92.70	96.50	66.50	54.50	85.00	76.10*
Average	95.10	92.00	81.05	63.78	68.64	82.31

No. 2 Bundles

	1979	1980	1981	1982	1983	1984
Jan	\$60.10	\$72.00	\$64.00	\$43.50	\$40.50	\$59.70
Feb	66.50	76.25	60.75	43.50	45.00	64.20
Mar	72.25	71.50	60.50	43.50	46.50	63.25
Apr	62.70	64.75	60.50	41.50	45.50	59.10
May	64.50	53.25	57.50	40.50	43.70	58.50
June	66.50	51.50	54.50	40.10	43.00	50.50
July	66.50	56.00	54.50	39.50	41.25	49.50
Aug	61.50	63.00	54.30	39.50	40.50	50.50
Sept	59.25	65.10	51.50	39.50	40.50	50.50
Oct	58.50	64.50	46.00	39.50	43.70	48.90
Nov	60.00	64.50	39.30	39.50	49.50	46.00*
Dec	66.30	63.50	37.50	39.80	55.00	45.50*
Average	63.71	63.93	53.41	40.80	44.55	53.86

*Estimate

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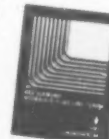
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STATISTICAL REVIEW

NONFERROUS PRICES AND PRODUCTION

U.S. Production of Primary Aluminum

Short tons

	1981	1982	1983	1984
Jan.	444,826	350,548	279,299	277,409
Feb.	404,225	310,405	245,601	357,391
Mar.	447,655	336,276	273,086	385,496
Apr.	431,189	318,619	270,450	382,946
May	441,356	320,897	291,751	402,479
June	419,602	299,914	288,209	386,850
July	425,115	296,986	312,991	384,912
Aug.	416,140	287,077	327,051	378,747
Sept.	393,012	271,147	329,625	362,805
Oct.	395,565	275,277	352,733	373,009
Nov.	364,375	266,366	349,945	350,000*
Dec.	364,164	275,120	375,574	355,000*
Total	4,947,925	3,608,632	3,696,315	4,497,044*

Source: Aluminum Association

*IA Estimate.

U.S. Production of Refined Copper

Short tons

	1980	1981	1982	1983	1984
Jan.	161,000	133,500	117,500	97,300	98,800
Feb.	149,500	116,300	123,400	100,600	110,700
Mar.	162,300	152,200	121,500	131,900	117,100
Apr.	170,400	155,800	116,400	125,500	120,500
May	158,700	135,000	107,500	112,200	127,900
June	167,200	158,300	108,600	114,500	125,600
July	52,400	131,700	81,800	73,100	123,000
Aug.	28,700	124,000	77,600	90,600	118,500
Sept.	27,300	140,500	80,600	91,200	101,900
Oct.	61,000	127,300	80,100	110,400	112,000*
Nov.	85,800	124,900	92,100	89,100	100,500*
Dec.	136,900	147,900	90,800	100,200	115,000*
Total	1,361,200	1,647,400	1,197,900*	1,236,800	1,362,00*
Average	113,433	137,263	99,825*	103,050	113,500*

Source: ABMS

*IA Estimate.

U.S. Production of Slab Zinc

Short tons

	1980	1981	1982	1983	1984
Jan.	30,511	33,445	26,706	20,010	25,526
Feb.	30,613	31,457	23,845	22,766	24,346
Mar.	34,777	34,450	23,639	24,994	23,865
Apr.	32,123	34,051	21,314	24,709	28,421
May	31,922	32,218	23,656	25,658	27,252
June	28,452	30,828	23,713	23,990	30,072
July	20,774	33,018	20,570	17,645	26,961
Aug.	26,703	33,534	22,433	25,601	28,033
Sept.	26,613	29,424	26,549	25,064	25,430
Oct.	30,990	29,778	27,348	26,532	25,410
Nov.	29,884	29,276	20,608*	27,275	26,000*
Dec.	33,247	25,301	19,945*	24,086	24,000*
Total	358,609	376,780	280,326*	288,530	313,286*
Average	29,885	31,398	23,361*	24,044	26,107*

Source: ABMS

*IA Estimate.

U.S. Production of Refined Lead

Short tons

	1980	1981	1982	1983	1984
Jan.	56,879	57,984	50,527	57,029	51,497
Feb.	49,324	53,569	45,193	50,943	51,374
Mar.	54,058	58,170	43,994	52,825	43,046
Apr.	47,493	52,741	36,111	49,938	39,993
May	47,044	35,038	54,323	47,230	32,231
June	47,142	24,378	52,974	42,045	26,161
July	52,037	33,027	44,224	39,525	26,401
Aug.	48,173	45,087	46,362	45,263	29,064
Sept.	50,158	43,704	49,201	41,226	25,287
Oct.	52,156	46,082	50,574	49,972	40,784
Nov.	48,438	39,412	???	50,886	42,100*
Dec.	53,456	44,036	48,585	46,381	41,400*
Total	606,358	533,238	572,614	572,283	458,308*
Average	50,530	44,437	47,718*	47,668	38,192*

Source: ABMS

*IA Estimate.

Aluminum 99.5 Pct Ingot

Cents Per Pound, Freight Allowed

	1973	1974	1975	1976	1977	1978
Jan.	25.00	29.00	39.00	41.00	48.00	53.00
Feb.	25.00	29.00	39.00	41.00	48.00	53.00
Mar.	25.00	29.24	39.00	41.00	48.00	53.00
Apr.	25.00	31.50	39.00	41.75	51.00	53.00
May	25.00	31.50	39.00	44.00	51.00	55.25
June	25.00	33.40	39.00	44.00	51.00	55.25
July	25.00	33.50	39.00	44.00	53.00	55.25
Aug.	25.00	35.94	41.00	47.00	53.00	55.25
Sept.	25.00	38.70	41.00	48.00	53.00	55.25
Oct.	25.00	39.00	41.00	48.00	53.00	55.25
Nov.	25.00	39.00	41.00	48.00	53.00	55.25
Dec.	27.00	39.00	41.00	48.00	53.00	55.25
Average	25.17	34.00	39.83	44.65	51.25	54.50
1979						
Jan.	55.25	66.25	76.00	76.00	76.00	81.00
Feb.	58.00	66.25	76.00	76.00	76.00	81.00
Mar.	58.00	66.25	76.00	76.00	76.00	81.00
Apr.	59.50	72.00	76.00	76.00	76.00	81.00
May	59.50	72.00	76.00	76.00	76.00	81.00
June	59.50	72.00	76.00	76.00	76.00	81.00
July	62.75	72.00	76.00	76.00	76.00	81.00
Aug.	62.75	72.00	76.00	76.00	76.00	81.00
Sept.	62.75	72.00	76.00	76.00	76.00	81.00
Oct.	66.25	76.00	76.00	76.00	81.00	81.00
Nov.	66.25	76.00	76.00	76.00	81.00	81.00
Dec.	66.25	76.00	76.00	76.00	81.00	81.00
Average	61.40	71.56	77.33	76.00	77.25	81.00†

†Nominal

Electrolytic Copper

Cents Per Pound

	1973	1974	1975	1976	1977	1978
Jan.	53.12	68.70	70.50	63.00	65.20	62.75
Feb.	56.12	68.70	63.00	63.00	67.50	62.25
Mar.	60.12	68.70	63.00	64.50	70.63	61.62
Apr.	60.12	68.70	63.00	68.00	74.00	64.00
May	60.12	81.20	63.00	70.00	72.80	64.33
June	60.12	86.10	62.25	70.00	69.88	65.23
July	60.12	86.30	61.50	74.00	68.75	63.50
Aug.	60.12	86.70	63.00	74.00	64.00	66.47
Sept.	60.12	83.00	63.00	74.00	60.00	66.83
Oct.	60.12	78.25	63.00	72.00	60.00	69.54
Nov.	60.12	75.80	63.00	65.00	60.00	71.20
Dec.	68.00	73.00	63.00	65.00	61.29	71.50
Average	59.86	77.00	63.44	68.95	66.17	65.77
1979						
Jan.	56.63	116.95	88.55	79.54	79.00	68.00
Feb.	89.36	134.17	86.01	79.41	82.75	70.00
Mar.	97.75	105.97	86.74	76.34	81.13	74.25
Apr.	90.50	94.57	88.15	76.87	82.40	76.50
May	89.50	92.91	85.99	78.86	82.81	71.50
June	86.39	92.32	85.11	71.67	80.88	69.25
July	85.95	102.88	83.99	71.64	81.75	66.50
Aug.	90.24	101.29	88.32	71.82	79.75	66.50
Sept.	92.36	98.78	84.90	71.87	76.75	65.50
Oct.	97.72	96.91	83.03	71.94	71.50	64.00
Nov.	98.49	96.02	81.93	72.25	68.64	66.00*
Dec.	106.10	86.13	80.97	73.12	69.25	66.00*
Average	92.12	101.90	85.31	74.61	78.05	68.83*

Iron Age Estimate

Straits Tin, Spot Price

Cents Per Pound†

	1979	1980	1981	1982	1983	1984
Jan.	624.18	758.95	643.35	696.66	578.82	565.09
Feb.	660.84	785.67	617.29	660.43	584.84	566.52
Mar.	684.35	812.18	607.75	589.40	598.42	576.75
Apr.	678.60	785.72	597.65	570.95	619.66	577.59
May	683.46	784.62	568.09	583.13	612.03	573.80
June	697.82	756.62	569.28	566.40	600.44	574.12
July	699.59	752.61	591.87	561.69	593.28	565.52
Aug.	678.57	751.51	652.76	584.08	583.50	567.17
Sept.	697.18	778.59	675.15	572.26	579.72	562.29
Oct.	714.24	744.36	698.17	556.11	580.58	550.60
Nov.	724.99	697.21	709.45	558.37	583.76	552.47*
Dec.	752.17	655.05	706.72	561.57	568.99	547.25*
Average	691.33	N.A.	636.63	586.75	590.34	564.93*

† U.S. cents per lb, EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo, beginning June, 1980. Prior prices are C.I.F., New York, based on Penang picul price.

N.A.—Not Applicable

*Estimate

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Zinc Prices

1971-81 Prime Western
1982 — High Grade
Cents Per Pound

	1973	1974	1975	1976	1977	1978
Jan.	19.50	31.18	39.00	37.68	37.00	30.50
Feb.	19.50	31.75	39.00	37.00	37.00	30.07
Mar.	19.63	32.70	38.75	37.00	37.00	29.00
Apr.	20.38	34.75	38.75	37.00	37.00	29.00
May	20.38	34.75	38.75	37.00	36.40	29.00
June	20.38	35.25	38.75	37.00	34.00	29.90
July	20.38	36.97	38.75	37.00	34.00	30.00
Aug.	20.38	38.00	38.75	37.00	34.00	31.88
Sept.	20.38	38.95	38.75	37.00	34.00	32.75
Oct.	20.38	39.00	38.75	37.00	32.80	33.75
Nov.	20.38	39.00	38.75	37.00	31.17	34.75
Dec.	30.00	39.00	38.75	37.00	30.50	34.75
Average	20.97	35.94	38.79	37.06	34.57	31.28

	1979	1980	1981	1982	1983	1984
Jan.	35.00	37.50	41.25	42.60	39.50	50.75
Feb.	36.89	38.67	41.63	43.00	40.00	51.00
Mar.	38.05	38.92	43.63	43.00	38.90	52.50
Apr.	38.50	38.50	43.75	35.75	38.25	53.00
May	38.50	37.50	46.50	36.00	40.00	52.50
June	38.57	36.50	46.63	35.80	40.00	52.25
July	39.64	35.50	46.63	38.50	40.90	50.00
Aug.	36.81	53.97	49.75	39.50	43.50	48.75
Sept.	36.07	36.60	49.75	41.00	46.00	46.75
Oct.	37.50	37.50	46.50	41.00	46.80	45.00
Nov.	37.08	38.60	46.75	40.20	49.00	45.00*
Dec.	37.50	40.50	43.75	38.25	49.00	46.00*
Average	37.51	37.70	45.54	39.55	42.65	49.46*

*Iron Age Estimate

Lead, Common Grade Price

Cents Per Pound

	1979	1980	1981	1982	1983	1984
Jan.	33.00	40.58	51.29	34.13	29.95	22.40
Feb.	33.00	43.75	50.00	30.68	28.00	21.95
Mar.	33.00	46.00	49.55	35.28	28.00	21.75
Apr.	33.00	48.00	45.45	37.63	28.50	22.00
May	31.23	49.76	36.00	37.00	28.50	21.55
June	31.00	57.62	34.25	38.25	25.80	21.20
July	31.00	58.60	35.77	41.25	27.90	21.15
Aug.	32.40	57.97	40.97	44.63	27.90	21.15
Sept.	34.30	58.60	42.40	42.50	26.75	22.00
Oct.	37.00	60.74	45.00	37.63	26.00	25.50
Nov.	38.00	58.27	44.00	34.46	23.75	26.00
Dec.	38.00	57.02	39.00	31.86	22.00	27.00*
Average	33.74	53.08	42.81	37.11	26.42	21.21*

*Iron Age Estimate

Electrolytic Nickel

Cents Per Pound, New York, Duty Paid

Oct. 1, 1976 to July 25, 1977	241.00
Published price suspended through Feb. 1, 1979	
Feb. 2, 1979 to Mar. 13, 1979	210.00
Mar. 14, 1979 to April 10, 1979	230.00
April 11, 1979 to May 13, 1979	255.00
May 14, 1979 to June 6, 1979	290.00
June 7, 1979 to Feb. 27, 1980	305.00
Dec. 5, 1979 to Feb. 27, 1980	325.00
Feb. 28, 1980 to Nov. 24, 1981	350.00
Nov. 25, 1981 to	329.00

Source: Inco, Inc.



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PRICE & PRODUCTION DATA

(Effective December 10, 1984)

Steel production by districts, thousands of tons (000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	147	158	127	189
Pittsburgh	184	175	195	214
Youngstown	88	83	90	104
Lake Erie	114	115	109	134
Detroit	136	124	143	134
Chicago	413	399	411	511
Cincinnati	88	91	84	91
St. Louis	71	77	68	66
Southern	164	168	176	163
Western	65	66	66	76
U.S. Production	1,470	1,456	1,469	1,691

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81.

86.9¢—U.S. Steel as of 3/15/82. Cleveland Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

**Effective 8/1/83.

NONFERROUS PRICES

(Effective December 10, 1984) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

[cents per lb.]	current price	last price	date of change
Aluminum (LME)	50.91	51.09	12/10/84
Copper (C)	62.50-	62.50-	
	63.00	64.00	12/ 7/84
Lead	23.00-	23.00-	
	25.00	28.00	12/ 6/84
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	218.77	214.19	12/10/84
Titanium Sponge	555.00-	555.00	
	585.00		4/29/82
Zinc	45.00	45.00-	
		48.00	9/21/84

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. CANADA: ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$140.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.25-1.55
Calcium, ton lots, crown	\$3.58
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$326.25
Indium, dollars per troy oz.	\$3.10-3.30
Iridium, dollars per troy oz.	\$450.00
Magnesium sticks, 10,000 lbs.	\$1.97
Mercury, per 76-lb. f.o.b. N.Y.	\$315.00-328.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective December 10, 1984)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1984	To Date 1983
Net tons, in thousands	1,470	1,456	86,803	77,523
Capability Utilization Rate	56.7	56.2	68.5	54.8

Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	26.822
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$78.50	\$78.50	\$79.17	\$86.17
No. 2 bundles	\$50.50	\$50.50	\$51.17	\$56.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$79.50	\$79.50	\$81.50	\$90.50
No. 1 steel, Philadelphia	75.50	75.50	75.50	83.50
No. 1 steel, Chicago	80.50	80.50	80.50	84.50
No. 1 bundles, Detroit	61.50	61.50	64.50	86.50
Low Phos., Youngstown	72.50	72.50	72.50	88.50
No. 1 mach'y cast., Pgh	66.50	66.50	66.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	97.50
No. 1 mach'y cast., Chi	110.50	110.50	110.50	111.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$142.25
Platinum, per troy oz.	\$320.00
Rhodium, per troy oz.	\$815.00
Silver ingots, per troy oz.	\$6.87
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Dec. 3—548.20	Dec. 6—548.60
Dec. 4—548.86	Dec. 7—547.54
Dec. 5—Holiday	

Scrap Prices Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	58 1/2	49 1/4
Yellow brass	53 1/2	50
Red brass	55 1/4	48 3/4
Comm. bronze	56	49 1/4
Mang. bronze	56 1/4	46 1/4
Free cutting rod ends	51	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	54
No. 2 copper wire	46
Light copper	37

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	50
No. 2 copper wire	42
Light copper	33
No. 1 composition	46
No. 1 comp. turnings	43
Hvy. yellow brass solids	35
Hvy. yellow brass turnings	31
Radiators	37

Aluminum		
New mixed clips	35	— 36
Old sheet	33	— 34
Old cast	33	— 34
Clean dry borings	33	— 34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	27	— 29
Mixed L.C. clips	24	— 26
Old sheets and cast	22	— 23
Borings and turnings	18	— 20
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	42	— 43
No. 2 copper wire	34	— 35
Light copper	29	— 30
Radiators	31	— 32
No. 1 composition	40	— 41
No. 1 composition turnings	37	— 38
Cocks and faucets	27	— 28
Clean heavy yellow brass	28	— 29
Brass Pipe	29	— 30
New soft brass clippings	41	— 42

Lead

Heavy soft lead	9	— 10
Whole batteries	3	— 4
Type metal	16	— 17
Electrotype	13	— 14

Nickel

Nickel solids	115	— 120
Nickel rod ends	115	— 120
Nickel sheets, clips	115	— 120
Nickel turnings	40	— 45

Zinc

New zinc clippings	18	— 19
Old diecast zinc	14	— 15

EFFECTIVE DECEMBER 10, 1984

(Effective December 10, 1984) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 79.00 to \$ 80.00
No. 2 hvy. melting	71.00 to 72.00
No. 1 dealer bundles	89.00 to 90.00
No. 1 factory bundles (auto)	89.00 to 90.00
No. 2 bundles	50.00 to 51.00
No. 1 busheling	70.00 to 71.00
Machine shop turnings	10.00 to 11.00
Shoveling turnings	51.00 to 52.00
Cast iron borings	49.00 to 50.00
Low phos. punchings plate	99.00 to 100.00
Heavy turnings	71.00 to 72.00
No. 1 RR hvy. melting	87.00 to 88.00
Rails, 2 ft. and under	103.00 to 104.00
Scrap rails, random lgh	93.00 to 94.00
RR specialties	97.00 to 98.00
No. 1 machinery cast	66.00 to 67.00
Cupola cast	59.00 to 60.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	370.00 to 380.00
18-8 turnings	470.00 to 480.00

Chicago

No. 1 hvy. melting	\$ 80.00 to \$ 81.00
No. 2 hvy. melting	75.00 to 76.00
No. 1 dealer bundles	89.00 to 90.00
No. 1 factory bundles (auto)	89.00 to 90.00
No. 2 dealer bundles	54.00 to 55.00
No. 1 busheling	87.00 to 88.00
Shredder scrap	89.00 to 90.00
Machine shop turnings	43.00 to 44.00
Mixed borings and turnings	44.00 to 45.00
Shoveling turnings	48.00 to 49.00
Cast iron borings	48.00 to 49.00
Low phos. large crop	114.00 to 115.00
Low phos. punchings plate	
1/4 in. and heavier	124.00 to 125.00
Low phos. 2 ft. and under	119.00 to 120.00
No. 1 RR hvy. melting	86.00 to 87.00
Scrap rails, random lgh	88.00 to 89.00
Roller rails	99.00 to 100.00
Rails, 2 ft. and under	113.00 to 114.00
RR couplers and knuckles	90.00 to 91.00
RR car axles	123.00 to 124.00
No. 1 machinery cast	110.00 to 111.00
Cupola cast	99.00 to 100.00
Stove plate	94.00 to 95.00
Steel car wheels	100.00 to 101.00
Stainless	
18-8 bundles and solids	490.00 to 500.00
18-8 turnings	420.00 to 430.00
430 bundles and solids	120.00 to 125.00
430 turnings	80.00 to 90.00

Philadelphia

No. 1 hvy. melting	\$ 74.00 to \$ 77.00
No. 2 hvy. melting	66.00 to 69.00
No. 1 dealer bundles	87.00 to 90.00
No. 2 dealer bundles	45.00 to 48.00
No. 1 busheling	87.00 to 90.00
Shredder scrap	94.00 to 99.00
Machine shop turnings	29.00 to 32.00
Mixed borings and turnings	29.00 to 32.00
Shoveling turnings	38.00 to 41.00
Low phos. 5 ft. and under	84.00 to 87.00
Low phos. 2 ft. punchings	110.00 to 113.00
Electric furnace bundles	95.00 to 98.00
RR specialties	87.00 to 90.00
Rails, 2 ft. and under	112.00 to 115.00
Cupola cast	76.00 to 79.00
Heavy breakable cast	57.00 to 60.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Brokers buying prices per gross ton on cars	\$ 50.00 to \$ 51.00
No. 1 hvy. melting	49.00 to 50.00
No. 2 hvy. melting	61.00 to 62.00
No. 1 dealer bundles	31.00 to 32.00
No. 2 bundles	60.00 to 61.00
No. 1 busheling	38.00 to 39.00
Machine shop turnings	44.00 to 45.00
Mixed borings and turnings	21.00 to 22.00
Shoveling turnings	45.00 to 46.00
Cast iron borings	31.00 to 32.00
Heavy breakable cast	40.00 to 41.00
Mixed cupola cast	56.00 to 57.00
Automobile cast	80.00 to 81.00
Stainless	
18-8 bundles and solids	445.00 to 455.00
18-8 turnings	350.00 to 360.00
430 bundles and solids	105.00 to 115.00

Youngstown

No. 1 hvy. melting	\$ 59.00 to \$ 62.00
No. 2 hvy. melting	42.00 to 45.00
No. 1 dealer bundles	71.00 to 72.00
No. 2 dealer bundles	35.00 to 38.00
Machine shop turnings	11.00 to 14.00
Shoveling turnings	16.00 to 19.00
Low phos. plate	71.00 to 74.00
Electric furnace bundles	49.00 to 72.00
Galvanized bundles	59.00 to 62.00

Cleveland

No. 1 hvy. melting	\$ 50.00 to \$ 53.00
No. 2 hvy. melting	34.00 to 37.00
No. 1 dealer bundles	62.00 to 65.00
No. 1 factory bundles	71.00 to 74.00
No. 2 bundles	19.00 to 22.00
No. 1 busheling	64.00 to 67.00
Machine shop turnings	6.00 to 9.00
Mixed borings and turnings	6.00 to 9.00
Shoveling turnings	7.00 to 10.00
Cast iron borings	99.00 to 101.00
Cut structural & plates, 2 ft. and under	100.00 to 103.00
Low phos. punchings plate	100.00 to 103.00
Drop forge flashings	35.00 to 38.00
Foundry steel, 2 ft. & under	57.00 to 60.00
No. 1 RR hvy. melting	73.00 to 76.00
Rails, 2 ft. and under	105.00 to 108.00
Rails, 18 in. and under	106.00 to 109.00
Steel axle turnings	50.00 to 59.00
Railroad cast	89.00 to 91.00
No. 1 machinery cast	99.00 to 101.00
Cupola cast	63.00 to 68.00
Stove plate	41.00 to 44.00
Stainless	
18-8 bundles	375.00 to 385.00
18-8 turnings	325.00 to 335.00
430 bundles	80.00 to 85.00

Buffalo

Brokers buying prices per gross ton on cars	\$ 62.00 to \$ 63.00
No. 1 hvy. melting	51.00 to 52.00
No. 2 hvy. melting	72.00 to 73.00
No. 1 dealer bundles	71.00 to 72.00
No. 2 bundles	36.00 to 37.00
Machine shop turnings	11.00 to 12.00
Mixed borings and turnings	12.00 to 13.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	20.00 to 21.00
Low phos. plate	92.00 to 93.00
Structural and plate, 2 ft. and under	95.00 to 96.00
Rails, 2 ft. and under	95.00 to 96.00
Scrap rails, random lgh	72.00 to 73.00
No. 1 machinery cast	78.00 to 79.00
No. 1 cupola cast	58.00 to 59.00

St. Louis

No. 1 hvy. melting	\$ 58.00 to \$ 59.00
No. 2 hvy. melting	47.00 to 48.00
Foundry steel, 2 ft.	58.00 to 59.00
No. 1 dealer bundles	58.00 to 59.00
No. 2 bundles	42.00 to 43.00
Machine shop turnings	17.00 to 18.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	27.00 to 28.00
No. 1 RR hvy. melting	58.00 to 59.00
Rails, random length	65.00 to 66.00
Rails, 18 in. and under	83.00 to 84.00
RR specialties	80.00 to 81.00
Cupola cast	72.00 to 73.00
Heavy breakable cast	50.00 to 51.00
Stove plate	83.00 to 84.00
Steel car wheels	94.00 to 95.00
Revolving rails	78.00 to 79.00
Unstripped motor blocks	61.00 to 62.00

Birmingham

No. 1 hvy. melting	\$ 68.00 to \$ 69.00
No. 2 hvy. melting	63.00 to 64.00
No. 1 dealer bundles	69.00 to 70.00
No. 2 bundles	45.00 to 46.00
No. 1 busheling	69.00 to 70.00
Shredder scrap	94.00 to 95.00
Machine shop turnings	23.00 to 24.00
Shoveling turnings	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Electric furnace bundles	67.00 to 68.00
Elec. furnace, 3 ft. & under	68.00 to 69.00
Structural and plate, 2 ft.	97.00 to 98.00
Structural and plate, 4 ft.	89.00 to 90.00
No. 1 RR hvy. melting	89.00 to 90.00
S. & W. rails, random lgh	85.00 to 86.00
Rails, 2 ft. and under	103.00 to 104.00
Angles and splice bars	89.00 to 90.00
No. 1 cupola cast	86.00 to 87.00
Unstripped motor blocks	67.00 to 68.00

Cincinnati

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 49.00 to \$ 50.00
No. 2 hvy. melting	48.00 to 50.00
No. 1 dealer bundles	60.00 to 61.00
No. 2 bundles	24.00 to 25.00
Machine shop turnings	4.00 to 5.00
Shoveling turnings	6.00 to 7.00
Cast iron borings	17.00 to 18.00
Low phos. 18 in. and under	82.00 to 83.00
Rails, random length	64.00 to 65.00
Rails, 2 ft. and under	77.00 to 78.00
No. 1 cupola cast	54.00 to 55.00
Heavy breakable cast	25.00 to 26.00
Drop broken cast	74.00 to 75.00

New York

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 48.00 to \$ 50.00
No. 2 hvy. melting	39.00 to 41.00
No. 1 dealer bundles	23.00 to 27.00
Mixed borings and turnings	11.00 to 13.00
Machine shop turnings	6.00 to 7.00
Shoveling turnings	14.00 to 15.00
Clean cast, chem. borings	35.00 to 36.00
No. 1 machinery cast	89.00 to 90.00
Mixed cupola cast	50.00 to 51.00
Heavy breakable cast	10.00 to 12.00
Stainless	
18-8 prepared solids	490.00 to 510.00
18-8 turnings	390.00 to 410.00
430 prepared solids	90.00 to 110.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 58.00 to \$ 60.00
No. 2 hvy. melting	48.00 to 50.00
No. 1 dealer bundles	58.00 to 60.00
No. 2 bundles	35.00 to 37.00
No. 1 busheling	65.00 to 67.00
Shredder scrap	65.00 to 67.00
Machine shop turnings	10.00 to 12.00
Shoveling turnings	18.00 to 20.00
No. 1 machinery cast	81.00 to 86.00
Mixed cupola cast	48.00 to 50.00
Heavy breakable cast	8.00 to 10.00

San Francisco

No. 1 hvy. melting	\$ 44.00 to \$ 46.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 dealer bundles	35.00 to 37.00
No. 2 dealer bundles	18.00 to 20.00
Machine shop turnings	6.00 to 8.00
Cast iron borings	6.00 to 8.00
No. 1 cupola cast	81.00 to 83.00

Los Angeles

No. 1 hvy. melting	\$ 45.00 to \$ 47.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 dealer bundles	36.00 to 38.00
No. 2 dealer bundles	18.00 to 20.00
Machine shop turnings	12.00 to 14.00
Shoveling turnings	8.00 to 10.00
Cast iron borings	6.00 to 8.00
Elec. furnace, 1 ft. and under (foundry)	74.00 to 76.00
No. 1 cupola cast	75.00 to 77.00

Seattle

No. 1 hvy. melting	68.00 to 70.00
No. 2 hvy. melting	57.00 to 59.00
No. 2 bundles	40.00 to 42.00
No. 1 cupola cast	92.00 to 93.00
Mixed yard cast	82.00 to 84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 87.00 to 81.00
No. 2 hvy. melting, cut 2 ft. and under	81.00
No. 1 dealer bundles	88.00
No. 2 bundles	60.00
Mixed steel scrap	57.00
Bush new fact. prep'd	89.00
Bush new fact. unprep'd	79.00
Machine shop turnings	31.00
Short steel turnings	33.00
Mixed borings and turnings	25.00
Cast scrap	79.00

Houston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 69.00 to \$ 70.00
No. 2 hvy. melting	56.00 to 57.00
No. 2 bundles	42.00 to 43.00
Machine shop turnings	12.00 to 13.00
Crushed turnings	29.00 to 31.00
Shredder scrap	73.00 to 74.00
Cut structural plate, 2 ft. and under	99.00 to 101.00
Cut structural plate, 5 ft. and under	83.00 to 85.00
Unstripped motor blocks	60.00 to 61.00
Cupola cast	77.00 to 78.00

PRODUCER KEY

With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Eliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Ownesboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S. C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Kentucky
K5 Kemco Div., Foote Mineral Co., Keokuk, Iowa

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp.
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston, Mass.

N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle, Wash.
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., North Tonawanda, N. Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.

S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh, Pa.
W14 Whittaker Steel Strip Div., Detroit Mich.

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled Inch-thick	Cold Finished	Hot-Rolled 8420 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8420 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	29.65	33.55	34.48	31.63	27.02	23.28	19.55	31.25	34.34	50.60	69.58	73.19
Baltimore	26.90	30.72	37.59	39.82	34.75	28.80	22.60	36.40	51.69	56.95	63.60	69.98
Birmingham	26.60	32.82	34.59	31.64	26.64	23.01	19.99	30.91	49.31	58.90	68.10	74.43
Boston	34.94	40.19	45.64	47.54	33.25	30.06	23.59	40.29	47.92	51.02	58.48	63.50
Buffalo	31.10	35.68	41.89	40.15	30.60	26.15	19.86	36.70	44.15	47.85	53.92	59.84
Chicago	28.46	34.62	37.60	32.74	22.40	22.00	17.70	30.30	38.02	41.09	46.52	52.75
Cincinnati	29.60	34.58	37.16	30.85	23.14	20.75	17.96	32.96	37.16	42.54	46.63	52.44
Cleveland	28.48	34.22	37.48	36.74	23.60	25.56	18.60	36.35	38.19	44.50	47.48	53.93
Denver	31.44	38.19	36.22	36.36	27.40	25.80	20.10	43.00	50.55	57.95	65.95	70.19
Detroit	29.21	35.20	37.87	31.39	23.13	23.86	16.96	32.71	37.18	42.51	46.81	53.49
Houston	27.67	28.71	31.69	39.21	26.73	27.73	22.60	40.15	45.96	52.87	58.95	66.14
Kansas City	30.72	36.05	38.70	34.01	27.10	22.95	17.90	33.12	39.60	45.40	49.73	54.87
Los Angeles	27.01	31.33	37.84	35.32	29.83	33.12	26.52	39.40	50.88	57.10	63.15	70.64
Memphis	26.37	32.51	35.34	33.57	27.75	26.63	21.40	33.87	36.78	49.96	59.80	69.44
Milwaukee	29.35	34.89	37.85	33.06	22.82	24.18	17.58	30.89	36.58	41.65	45.66	52.60
New York	32.47	38.99	42.55	43.38	32.66	25.31	21.06	40.05	40.90	46.40	51.84	55.34
Philadelphia	28.10	38.99	41.23	43.50	31.05	28.11	18.99	36.44	45.80	50.25	60.22	65.42
Pittsburgh	35.27	40.97	45.23	43.45	37.60	30.44	21.29	28.74	38.43	44.64	49.90	54.10
Portland	28.96	32.08	38.73	36.93	32.88	34.78	27.87	44.85	49.78	57.74	70.44	.....
San Francisco	26.94	31.55	38.60	35.58	28.61	31.19	25.78	39.72	50.70	57.69	63.90	70.05
Seattle	23.61	30.12	36.65	32.95	22.02	27.32	25.81	39.14	53.03	61.70	69.75	74.63
Spokane	21.21	30.42	35.65	38.02	35.00	33.77	21.97	43.01	43.20	47.52	.....	58.32
St. Louis	29.11	34.60	37.31	34.59	23.89	22.90	18.15	33.87	38.12	43.51	47.85	53.69
St. Paul	28.87	33.61	36.69	38.36	23.81	23.73	17.70	33.96	37.52	42.72	47.09	53.31

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120. Cold-rolled sheet, 20 ga x 36 x 120. Galv. sheet—16 ga x 36—120. Hot-rolled strip—1/8" x 1", Plate 1/4" x 84'. Shapes—I-Beams 6 x 12.5. Hot-rolled bar—Rounds 3/4-2-15/16. Cold finished bar—C 1018—1" rounds. Alloy bar—Hot-rolled 8620—1.5/8" round. Cold drawn—1" round. Hot-rolled 4140—1.5/8" round. Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

STEEL PRICES

Codes identify Producers listed in the key on p. 108. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Re-rolling, Midwest	
W5	\$366.00
N4	\$366.00
West	
C6	\$346.00
Carbon Forging, East	
B3(2), C10, U1	\$473.00
R3	\$453.00
Midwest	
R3, W5	\$453.00
S1, U1, I3	\$473.00
C10	\$473.00
K2	\$473.00
West	
B3(2)	\$463.00
C6	\$453.00
Alloy, East	
R3	\$492.00
B3, U1, C10	\$512.00
Midwest	
W5	\$492.00
U1, C10, I3	\$512.00
R3	\$492.00
S1	\$512.00
West	
B3	\$502.00
C6	\$469.00

Piling Sheet Steel

(cents per lb)

Midwest	
U1	\$ 26.45

Structurals

Carbon, East	
B3	\$ 22.90
U1, J3	\$ 23.90
Midwest	
C20	\$ 22.90
W8	\$ 22.90
I3, T10, U1, N4	\$ 23.90
West	
C6	\$ 25.10
B3(2)	\$ 21.65
South	
C16, U1	\$ 23.90
T10	\$ 22.90
A8	\$ Cmp.
High-Strength, Low Alloy, East	
B3	\$ 22.90
U1, J3	\$ 23.90
Midwest	
N4	\$ 23.90
W8	\$ 24.15
U1	\$ 23.90
I3	\$ 23.90
West	
B3	\$ 21.65
South	
U1, C16	\$ 23.90
Wide Flange, Carbon, East	
B3	\$ 22.90
U1, J3	\$ 23.90
Midwest	
U1	\$ 23.90
N4	\$ 23.90
I3	\$ 23.90
West	
C6	\$ 24.15

Strip

Hot-Rolled, Carbon, Cut II

Edge—all widths, East

U1, B3	\$ 23.75
J3	\$ 22.05
Midwest	
D1	\$ 22.05
I4	\$ 22.85
J3, W3	\$ 22.05
G2, G3	\$ 23.45
N4	\$ 22.55
W5, S1, A7	\$ 23.75
U1, B3, I3	\$ 23.75
M2, R3	\$ 22.05

West	
B3	\$ 26.55
South	
R3	\$ 22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	\$ 29.75
S10	\$ 29.60
P15	\$ 24.80
B4	\$ 36.60
G6	\$ 36.175
Midwest	
I4	\$ 38.30
W14	\$ 32.80
J4	\$ 34.05
S1	\$ 37.05
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge—all widths, (plus extras)*	
Midwest	
M2, R3, W3, J3, I3	\$ 22.05
G2, G3	\$ 23.45
S1	\$ 23.75
A7	\$ 25.35
South	
R3	\$ 22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge	
Midwest	
S1	\$ 37.05
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	\$ 26.10
I4	\$ 25.20
Alloy, Cold-Rolled, East (plus extras)*	
E4, M8	\$ 43.35
B4	\$ 47.25
P15	\$ 32.10
Midwest	
I4	\$ 44.30
S1	\$ 44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyrl)

East	
B3	\$ 23.75
J3	\$ 22.05
U1	\$ 23.75
Midwest	
M2, R3, W3	\$ 22.05
D1, J3	\$ 22.05
G2, G3	\$ 23.45
I4	\$ 22.45
U1, W5, S1, B3, I3, A7	\$ 23.75
West	
U1	\$ 24.25
South	
R3	\$ 22.05
Cold-Rolled, East, Class I	
B3(2)	\$ 28.15
J3	\$ 26.15
I3	\$ 28.15
Midwest	
R3, M2, W3	\$ 26.15
G2, G3, M11	\$ 27.85
I4	\$ 22.00
J3	\$ 26.15
D1	\$ 26.15
U1, W5, S1, B3, I3, A7	\$ 28.15
West	
U1	\$ 28.65
South	
R3	\$ 24.65
Galvanized (hot-dipped), East	
B3(2)	\$ 30.30
U1	\$ 30.30
Midwest	
J3, D1, W3	\$ 28.00
R3, Y1	\$ 28.00
G2, M11	\$ 30.00
U1, W5, S1, I3, A7	\$ 30.30
West	
U1	\$ 30.80
South	
R3	\$ 28.00
Enameling, Midwest	
U1, S1, I3, A7	\$ 29.65
J3	\$ 27.65
Long-Term, Midwest	
W5, A7	\$ 31.65
U1	\$ 31.65
R3	\$ 29.35

Wire Rod

East	
B3(2)	\$ 22.35
Midwest	
N4, K2	\$ 22.35
U1	\$ 24.10
A7	\$ 22.00

West	
C6	\$ 21.45
South	
C7	\$ 22.35

Tinplate

Electrolytic Tinplate

Single Reduced (70 lb)	
East	per base box
J3	\$ 26.29
U1	\$ 27.74
B3	\$ 27.54
Midwest	
U1	\$ 27.74
J3	\$ 26.25
M11	\$ 27.24
W3	\$ 26.29
W5	\$ 27.74
West	
U1	\$ 28.24
South	
U1	\$ 27.74
Double Reduced (55 lb)**	
Midwest	
M11	\$ 21.87
J3	\$ 21.49
U1	\$ 22.37
W3	\$ 21.49
W5	\$ 2.37
West	
U1	\$ 22.87
South	
U1	\$ 22.37
Black Plate	
Single Reduced (75 lb)*	
East	
B3	\$ 24.31
Midwest	
J3	\$ 24.01
I3, W5	\$ 24.57
W3	\$ 24.01
U1, M11	\$ 25.26
West	
U1	\$ 25.26
Double Reduced (55 lb)	
East	
B3	\$ 20.49
Midwest	
M11	\$ 19.70
W5	\$ 19.70
J3	\$ 18.93
W3	\$ 18.93
U1	\$ 19.70
West	
U1	\$ 19.70
South	
U1	\$ 19.70
**70 lb—base weight extra 45¢	
**50 lb—base weight extra \$1.40	

Bars

Carbon Steel, Hot-Rolled

(Special quality)

East	
R3, K3	\$ 25.80
R5	\$ 25.80
J3	\$ 25.80
U1, C10, B3(3)	\$ 27.05
Midwest	
I4	\$ 23.95
U1, I3	\$ 27.05
R3, T10, C20, N4	\$ 25.80
K2	\$ 22.00
I3	\$ 20.25
A7	\$ 20.25
West	
B3	\$ 25.80
C6	\$ 24.45
South	
A8	\$ 20.65
C16	\$ 25.80
Cold-Finished Carbon, East	
A11	\$ 22.15
R3	\$ 33.75
T11, S8	\$ 31.00
J3(4), L2	\$ 31.00
M8, W10	\$ 31.00
N1	\$ 24.475
R4	\$ 33.25
B4	\$ 33.25
C10	\$ 31.00
Midwest	
W10, B3, M9	\$ 33.25
J3	\$ 31.00
B1	\$ 33.45

L2	\$ 30.75
N9	\$ 31.00
W14	\$ 22.20
B5	\$ 34.75
West	
R3	\$ 37.15
South	
J3	\$ 34.00
C16	\$ 24.40
J3	\$ 31.95
Alloy, Hot-Rolled, East	
R5, K3	\$ 27.95
R3, J3	\$ 27.95
U1, B3(2), C10	\$ 29.20
Midwest	
R3	\$ 27.95
I3, C10, U1	\$ 29.20
I4	\$ 26.10
I3	\$ 23.50
A7	\$ 20.25
West	
B3	\$ 27.95
C6	\$ 26.60
South	
A8	\$ 22.00
Alloy, Hot-Rolled, East	
L2	\$ 35.20
R3, N1	\$ 37.90
R4	\$ 37.10
AF11	\$ 30.50
I3, W10, L2	\$ 34.85
T11, S8	\$ 34.85
C10	\$ 34.85
Midwest	
R3	\$ 37.35
J3, W10, C10	\$ 34.85
B1	\$ 37.30
N9	\$ 34.85
L2	\$ 34.85
B5	\$ 36.60
M9	\$ 37.10
West	
R3	\$ 40.75
South	
J3	\$ 35.85
C16	\$ 28.00

Plates

Carbon Steel, East

B3	\$ 23.25
I4, U1	\$ 25.75
P2	\$ 23.25
J3	\$ 26.75
Midwest	
B3	\$ 23.25
I3	\$ 25.75
I3, A7	\$ 22.80
U1, I4, S1	\$ 25.75
R3	\$ 26.75
West	
C6	\$ 24.25
U1, B3	\$ 25.75
O2	\$ 23.00
South	
R3	\$ 25.75
U1	\$ 25.75
Alloy East	
B3	\$ 31.05
U1, L4	\$ 33.55
P2	\$ 33.55
J3	\$ 34.55
Midwest	
B3	\$ 31.05
G2, G3	\$ 33.55
I4, U1	\$ 33.55
West	
B3	\$ 33.55
O2	\$ 31.00
South	
U1	\$ 33.55

Wire

Carbon Steel Wire, East

B3	\$ 27.10
A11	\$ 22.15
Midwest	
R3	\$ 24.60
N4, W7	\$ 27.40
K2	\$ 24.20
South	
A8	\$ 22.85

West

C6	\$ 24.95
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CHILTON'S

January 18, 1985

C2150-8

IRON AGE

MANUFACTURING MANAGEMENT

**FACTORY 2000:
DO ROBOTS
HAVE A MIND**

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CONGRESSIONAL INFORMATION
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MD 20814
CTA

CHILTON'S
IRON AGE
MANUFACTURING MANAGEMENT

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Food and energy prices are on the up escalator.	
Next Issue: Building the All-Composite Airplane.	

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ONE OF THE ABC PUBLISHING COMPANIES

In fact, the Japanese government pledged to help raise 25 pct of the construction costs.

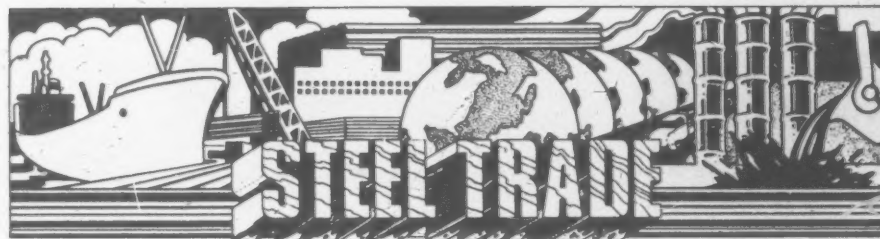
California also supported the plan, at least when it was first announced. In 1982 the state legislature authorized the sale of \$1.25 billion in state revenue bonds to help raise money for the bullet train. It was also exempted from many state environmental regulations.

Bullet train proponents claimed once the project was operational, it would be self-supporting. But opponents, which included many state newspapers, politicians, and environmentalists, claimed the project would ultimately cost much more than originally estimated and would never be able to attract an adequate amount of riders.

The system has to be all-electric, using an overhead catenary system. The 131 mile system was planned to maintain 100 trains per day operating at a top speed of 160 mph. It was to take 59 minutes to make the run.

Fluor Corp. of Irvine, Calif. had been selected to build the system and to serve as construction and engineering project manager.

American High Speed Rail officials told reporters that Amtrak would purchase the engineering and marketing data compiled on the proposed route, and that AHSRC would cease operating when the last of the \$10 million with which the company had been funded was spent. Most of the money had come from Japanese and American companies that had a stake in the ill-fated project.



Administration obtains steel trade accords with 7 nations

Voluntary trade agreements were negotiated by the U.S. with nations which accounted for 53 pct of American steel imports in 1984.

The seven nations in question were Australia, Brazil, Japan, Mexico, South Africa, Korea and Spain. Already in place was the 1982 European Common Market agreement which covered 22 pct of last year's imports.

Domestic producers praised the Reagan Administration for its progress in limiting steel imports through voluntary agreements. Announced Sept. 18, the Reagan program called for holding imports of finished steel to 18.5 pct of U.S. supply. Imports of semifinished steel would be no more than 1.7 million tons.

Government officials had carried out the trade negotiations "with great skill and dedication," said Donald H. Trautlein, chairman of Bethlehem Steel Corp. and of the American Iron & Steel Institute (AISI).

"The process of implementing the President's program is just beginning," Mr. Trautlein added, "and will require considerable further action."

As of late 1984, no

agreements had been reached with countries that accounted for 25 pct last year's imports. Canada accounted for 12 pct of the total. The combined tonnage of Sweden, Venezuela, Finland and Argentina came to 7 pct.

When the seven agreements were announced Dec. 19, U.S. producers promptly took action against countries still outside the program.

United States Steel Corp. filed dumping and subsidy suits against Ven-

Norwegian and Polish suppliers of structural steel. Bethlehem Steel sought curbs on sheet from Finland.

U.S. Steel said its trade actions were "complementary" to the government's negotiations. It wasn't clear if the suits were aimed at providing leverage for negotiations or were seen as the only means of dealing with some countries.

The Canadian situation was hazy at yearend. Canada's major steel produc-

1984 Imports - Nine Months

Country	Tonnage	Pct Share of Imports	Proposed Pct of U.S. Supply
EEC	4,438	22	5.4
Voluntary Agreements			
Japan	5,060	26	5.8
Korea	1,835		1.9
Spain	1,236		0.67
Brazil	1,044	27	0.8
South Africa	0,493		0.42
Australia	0,170		0.18
Mexico	0,707		0.38
No Agreements			
Canada	2,402	12	(3)
Venezuela	0,376		
Argentina	0,238	7	
Sweden	0,501		
Finland	0,267		
Others	1,188	6	

ezeuela, Austria, Sweden, and five Communist countries: Czechoslovakia, East Germany, Hungary, Poland and Romania. The suits dealt mostly with sheet products.

Chaparral Steel Co. filed complaints against

ers have never been charged with dumping or illegal subsidies. The Canadians have argued that they shouldn't be included in a program that is supposedly directed only at unfair trade.

(Cont. on p. 18)

DO ROBOTS HAVE A MIND OF THEIR OWN?

Manufacturers are beginning to use robots with sensing and intelligence that can adapt to changing factory conditions.

BY ROBERT E. HARVEY

Robots, sophisticated enough to sense objects, intelligent enough to interpret those sensings, and adaptable enough stay on top of changing factory conditions, are the wave of the near future.

"I am not making a prediction but I would think that by 1990, the vast majority of robots will have adaptive capabilities, perhaps all of them," explained Dick Beecher, manager of robotics, advanced product and manufacturing engineering staff, General Motors Corp.

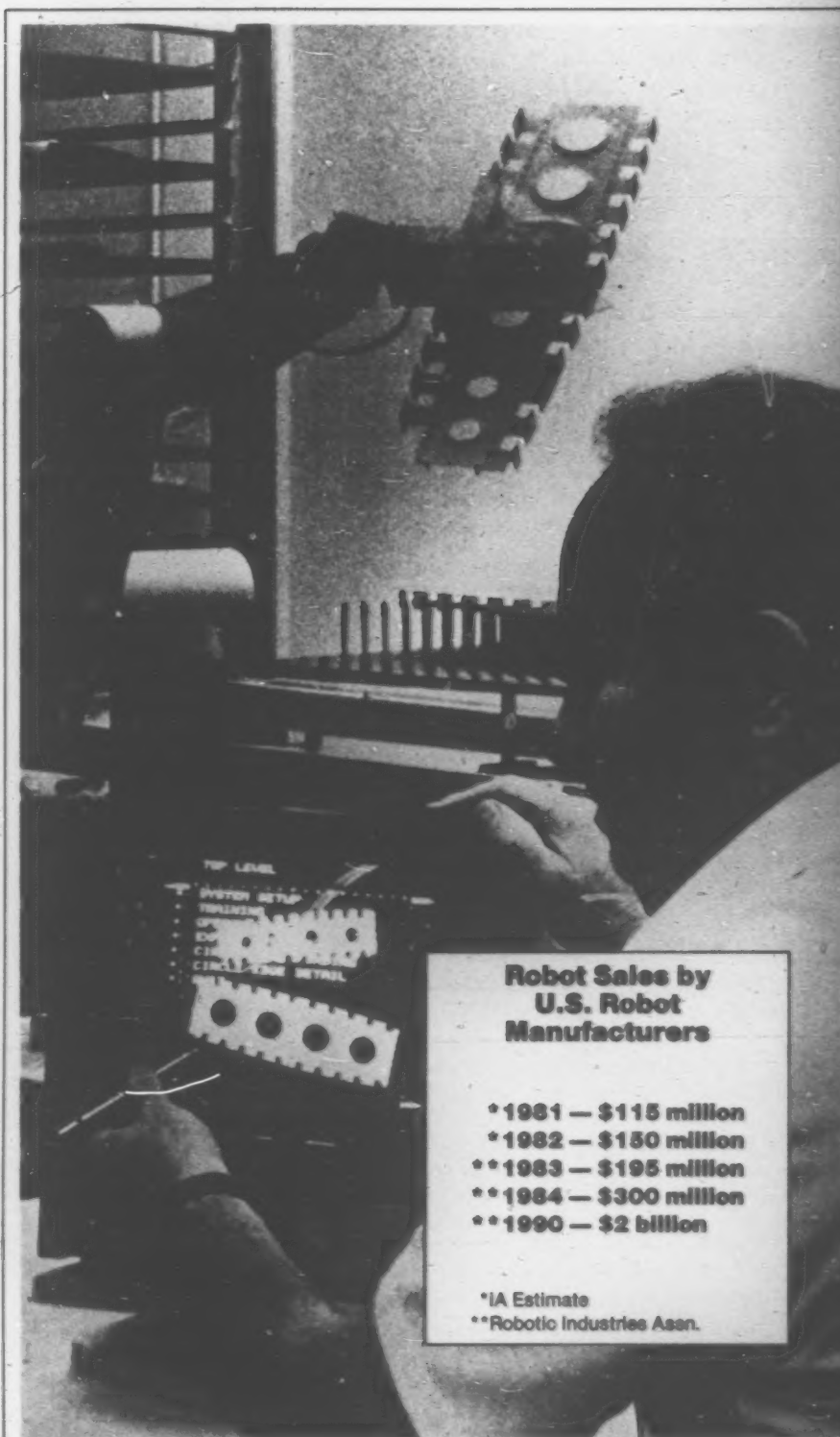
Most advanced robotic systems today remain laboratory curiosities—however, not all. The recent installation of some intelligent systems signals a major step forward in automation development.

General Motors, already using robots for body shop tasks like spot welding, is now sending robots into trim and chassis operations.

"In those areas GM does not want to invest heavily in the fixed tooling needed to accurately position the auto bodies. Nor does GM want to fixture each body at each location," said Richard E. Hohn, product manager, Industrial Robot Division, Cincinnati Milacron Co., Lebanon, Ohio. "So they are looking at what could be called flexible fixturing."

Flexible fixturing lets robots adjust to inaccurately placed parts.

"The auto body is moved into position but that position can be off plus or minus an inch or two," said Mr. Hohn. "Next, the 3-D vision system, looking at three gage holes in the body, determines its precise location. The data is transferred to



Robot Sales by U.S. Robot Manufacturers

- *1981 — \$115 million
- *1982 — \$150 million
- **1983 — \$195 million
- **1984 — \$300 million
- **1990 — \$2 billion

*IA Estimate

**Robotic Industries Assn.

Grasping an aluminum aircraft section, an experimental robot at Lockheed-California Co., operates with the aid of a video camera.

Robot Technology Trends

Materials: Lighter and stronger materials for robot structures will be developed. These will include both organic and non-organic substances. As a consequence, the size and weight of robots will decrease.

Power Sources: Small, high-capacity power sources such as nuclear powered generators or fuel cells will allow robots greater freedom of location and movement.

Actuators: Small, high performance actuators will appear. Robot designs will be more stylish.

Sensors: Small, reliable, high-performance, low-cost artificial eyes, ears, and tactile sensors will be developed and even low-cost robots will have recognition capability.

Control Systems: Advances in microcomputer technology will dramatically improve robot control. Control system costs will also be greatly reduced.

Communications Systems: Remote control of industrial robots will be enhanced through development in fiber optics, wireless communications, etc.

Processing Methods: New, non-mechanical processing methods such as laser beam cutting, welding and other high-energy processing methods will reduce the processing load on robots and make the design work for them simpler.

Robot Body Structure: Utilization of biomechanical concepts will result in superior robot structures.

Software: Robot use will become easier through the development of robot languages, self-diagnosing systems and robot application technologies. Software will contribute to reducing the design work needed on robots.

Integrated Systems: Techniques for integrating production systems composed of men, machines and robots as well as their peripheral devices will be found. Further, their design processes will be computerized.

Source: Overview of Artificial Intelligence and Robotics Vol. 2, National Bureau of Standards.

the robot which uses the information to offset its original program and adjust its actions accordingly.

"We have some systems being installed that use this approach. In one case a body is precisely located so that sealant can be applied by the robot. In another, the vision system calculates the position of a windshield opening so a robot can correctly insert the windshield."

With vision structuring the environment for the robot, less expense goes toward the equipment that delivers and fixtures the parts that the robot works on.

In another application, GM has for the past year been using robots with vision to install door trim. Parts arriving on pallets are loosely positioned before a robot. The robot's task is to insert four different

fasteners.

A 2-D vision system shows the robot where the fasteners should go and how much the robot should offset its program.

In the past, if a robot was programmed to insert a screw, for example, into a part, it would do its job oblivious to its environment. Now with tactile sensing and vision, it can adopt to unexpected changes such as a missing screw or misalignment of parts.

Adaptable Robots

This new technology provides manufacturers with a choice between non-adaptable and adaptable manufacturing systems.

"It becomes a matter of an economic tradeoff," explained Mr. Beecher of GM. "One of the problems with robots in the past is that they

have to operate within a structured environment. If you don't have some kind of structure, then you need some type of adaptive control. Is it less costly to structure the environment or is it less costly to apply some sort of sensory capability to allow the robots to adjust to the less structured environment?"

The aerospace industry, while as different as night from day in its manufacturing methods from the automotive industry, also is looking for intelligent robots that can adapt to less structured environments. The industry wants ease its dependence on hard inflexible tooling.

"Unlike the auto industry we build large complex items very slowly," explained Wallace J. Plumley, group engineer, Robotics and Automation Group, Manufacturing Research Division, Lockheed-Georgia Co., Marietta, Ga. "We are building our high-volume plane, the C-130, at a rate of two and-a-half to three a month. We have thousands of parts which go into each shift, but we do not have enough parts of any one kind flowing through to have a continuous flow. With a flexible robot, however, we can run families of parts through manufacturing cells. But we need to eliminate our hard tooling, which is expensive to make and to maintain."

The aerospace industry needs smarter robots because, while automation is needed to insure quality and precision, short product runs make hard tooling prohibitively expensive to use.

Another reason for intelligent robots: "We have been building C-130 aircraft since the late 1950s," said Mr. Plumley. "We have changed models several times. But since the Air Force would not enjoy scrapping an airplane because we scrapped the tooling for that particular model in 1962, we have to store large amounts of tooling. However, tool storage would be no problem if tooling was simply magnetic impulses on tape, which could be fed into a robot or a flexible manufacturing system."

Lower Tooling Costs

Although very few are currently in operation, advanced robotic sys-

tems are recognized by many as a necessary response to the dizzying variety of parts and part changes that go into aircraft production.

Lockheed-California Co., for example, has developed an experimental intelligent robot riveting system. As parts to be riveted are retrieved from storage trays, an overhead camera identifies them, using geometric data from a data base.

With this information, the robot can recognize and verify the part before it positions it on the riveting machine. One camera helps align the part, while other cameras verify the rivet's location and inspect the work while it is progressing.

The robot picks up parts with a flexible multi-fingered pneumatic gripper and can handle many part configurations without requiring templates and specific tooling.

As evidenced by what is being done by General Motors and others, the technological obstacles that have stood in the way of advanced robotic development are being overcome. The systems expertise and hardware (the robot arms, sensing systems and controls) needed to cost-effectively implement intelligent robotic manufacturing systems are available now, say robot users.

"We believe that current unmanned machining systems are reliable enough to run without anomalies for extended periods of time," said Robert L. McMahon, Jr., manager of factory systems, General Dynamics Corp. "In fact we have decided to put in a flexible manufacturing system."

With hardware now developed to the point where it is now adequate for advanced robotic systems, the development of software to coordinate this hardware will command the lion's share of attention for the next few years. Much work must still be done on coordinating the machines within a robot cell as well as getting robot and machine tool controllers to work well with supervisory computers.

Software Needed

"One of our activities involves developing manufacturing cells, and the bulk of the development re-

quired there is certainly in the development of the software," said Mr. Beecher of GM. "For example, we have a system in our labs that uses similar robots, so they all talk the same language and they all talk with the same controller. But there is still miles of software required to interface all this and to get that cell to do all the things we want it to do."

The high development costs of specialized software is an expense that will remain high, although many believe that standard software and communications standards such as the Manufacturing Automation Protocol (MAP) will lead to lower costs. MAP is a set of communications standards for off-the-shelf hardware and software being developed under GM's guidance which will allow manufacturing equipment to communicate with each other.

Mr. Beecher of GM, however, doesn't believe that MAP, while very beneficial, will reduce the cost of software for robots. "Software has been that black box, that proprietary edge, that one manufacturer might have over another. As long as GM (MAP) can enable these systems to talk to each other, regardless of what language they might speak individually, we can do a good job."

However, robots aside, MAP should make software packages more marketable, remarked another GM official.

"The technology (for advanced robotic systems) is certainly here," suggested Christopher Lea, manager of marketing applications for vision products, Automation Intelligence Inc., Orlando, Fla. "With advancing microprocessor technology leading the way, the cost of the hardware is coming down and that trend is going to continue."

"The software costs for custom packages are very expensive and the way to get around that is with standard packages. However, at this time, nothing plays together readily and easily, making the costs for these systems relatively high."

Lester V. Ottinger, president, RSI (Robot Systems Inc.), Norcross, Ga., believes that MAP will reduce some costs. "Prices should come down. When you have a standard

Desirable Goals for Future Robots

- Rudimentary sense of vision to provide
 - Recognition data
 - Orientation data
- Tactile sensing to provide
 - Recognition data
 - Orientation data
 - Physical interaction data
- Computer interpretation of the visual and tactile data
- Multiple appendage hand-to-hand coordination
- Computer directed appendage trajectories
- Mobility
- Minimized spatial intrusion
- Energy conserving musculature
- General purpose hands
- Man-robot voice communication
- Total self diagnostic fault tracing
- Inherent safety (Asimov's Laws of Robotics)
- All the capabilities above available for a price which allows purchase and operation within the traditionally accepted rules for economic justification of any new equipment.

Source: J. F. Engelberger, *Robots in Practice*, American Management

and everyone is building to the standard, redesign and debugging is minimized. However, the price reductions will probably not be primarily in software but in peripherals and communication links."

"The biggest cost is certainly in software but not computer software," said Mr. McMahon of General Dynamics. "It is really in application development, trying to understand everything that goes on in a particular operation, all the tasks that people perform."

Mr. McMahon believes, however, that with computers growing more

(Cont. on p. 34)

powerful, expensive efficient software will not be needed. "You will be able to buy standard inefficient software and customize it to your particular application. It will not be very efficient, but with computer power becoming so cheap, who cares."

If software is becoming the overriding concern, continued advances in hardware are also needed if sophisticated robotic systems are to catch on in a big way.

Hardware Needed

"Just because the hardware for advanced robotic systems is available does not mean that we are completely satisfied with it, we certainly are not," remarked Mr. Beecher of GM. "For example, industrial robots are not fast enough, they are not as accurate as we would like them to be. They are not as repeatable, not as energy efficient, and they don't have the weight carrying capacity we would like."

In addition, Mr. Beecher is still looking for robots that travel from place to place. "We expect to see in the relatively near future robots with mobility. Not just the ability to move laterally on a track but actually move around a plant.

"We also are hampered because of the inflexibility of end effectors or grippers. Every time we want to handle something different we have to design a new gripper to handle the bloody thing. In addition, we need what we call smart end effectors or grippers."

These smart grippers would be able to do things like sense torque in a screw driver as well as know if the screw to be turned actually exists.

"Another thing we have a problem with is having to shut down a manufacturing line in order to reprogram the robots. Off-line programming is a big need," said Mr. Beecher. GM is working with several off-line programming systems (including one they have developed on their own), but so far none have been applied on a large scale.

"Another problem we have been trying to master for years is the black art of parts feeding and orientation," said Mr. Beecher. "We

need parts feeders that are more universal and programmable. It is still difficult to crowd material around robots in such a way that the robots can actually get at them."

The solution to the material handling problem will probably be a combination of improved material handling and vision systems

GM is looking at using one robot to feed another robot. "The best universal parts feeder we can find, apart from the human, is another robot. So we are considering the possibility of robots presenting parts to other robots: material handling robots supplying manufacturing robots, for example, continued Mr. Beecher."

Wishing to expand its use of robots, the aerospace industry also is interested in seeing some hardware improvements.

"We could certainly use a hand that is capable of picking up a part regardless of orientation," reported Mr. Plumley of Lockheed-Georgia. "We could certainly use a vision/computer/robot combination that could pick detailed parts out of a plastic tote pan and properly orient them in an assembly fixture. We could certainly use robots, either very large or track mounted, that could sink rivets from both sides of a 10 ft by 30 ft fuselage section. All of these developments are just beyond what is available today."

Intelligent Robots

Eventually, robots will be able to respond to a wide variety of sensory cues, to learn by experience, and to acquire skills by self optimization. Such skills would then be transferred to other robots so that learning could be propagated rapidly though out the robot labor force.

Robots continue to acquire increasing intelligence and sensing capability, making them increasingly mobile, dexterous, and adaptable. As a result of the newly available technology to be able to program robots off-line, robots will work longer hours and will not sit idle during programming.

Improved command languages will make robot programming increasingly easy. Eventually, robot

programming will consist of simply giving the robot a certain set of tasks or goals and leaving it up to the robot's intelligence to figure out the specifics as to how to best perform the tasks.

Artificial intelligence (AI) is the discipline concerned with developing programs to make robots more intelligent, more human-like. AI is being used in a number of experimental robotic programs.

Lockheed-Georgia, for example, developed a flexible robotic assembly cell that carried out specific operations when given only very general instructions.

"We developed a small prototype system using a robot, a personal computer and a 2-D vision system," explained Mr. Plumley. "We developed a simple AI planning cell which essentially did what an actual manufacturing system would do only on a smaller scale. You would tell the robot cell that you wanted to build a particular assembly. It would then try to find out what that assembly was by running up up to a simple CAD data base.

"It would then research the assembly, not only to find out what it looked like, but what pieces it consisted of, how many holes were required, where they were, and so on. The system then knew it had to drill holes, attach stiffeners or some other operation."

The robot would then use its vision system to locate the part on the parts rack. If the part was the right one, it would, using the vision system again, position the part on a table, locate a clamp, clamp the part, pick up a drill, and simulate drilling.

According to Mr. McMahon, the chief value of AI will be its ability to help systems recover from or correct unforeseen occurrences.

The automated systems, of today, are automated only until something goes wrong, then they need humans to help them recover.

Using AI and other future technologies, tomorrow's robot will not only be a servant but also will be a decision maker. And someday, it will not only be able to adapt to a constantly changing shop floor but be able to learn while on the job.

CAN COPPER BOUNCE BACK AFTER BEING FLOORED?

Although the U.S. companies place themselves in the center of the cost spectrum, the World Bank scenario seems to point toward contraction of capacity in North America and more dependence on South American and African sources.

BY ROBERT J. REGAN

It's no secret that the 1983-84 business recovery passed copper by, trailing in its wake a lengthening string of pundits predicting the demise of the U.S. copper industry, or large parts of it.

It's also no secret that back in the 70s these same pundits were pronouncing the demise of the convertible car and the end of the romance with the automobile. The "rag top" of course, is back with us (for the time being at least) and Detroit's recovery suggests that the romance didn't end, it just went into therapy.

Copper's problems are deeper than the car industry's and, while they can't be cured overnight by whimsical shifts in consumer preference, they aren't necessarily terminal. The industry's self-diagnosis includes a quick fix from higher copper prices and a measure of assistance from government circles to help ride out the time it takes for foreign producers to exhaust their potential for trading cheap copper to European and U.S. consumers for quick-fix foreign exchange resources. Meanwhile, the U.S. companies will keep slugging at the World Bank, the IMF and international lending agencies they hold have prolonged the agony.

Curiously enough, the World Bank recently revised downward its assessment of copper price prospects from 1982 projections, citing "structural changes in demand and supply, namely the worsened demand outlook, the continued compe-

tition between producers for market shares and the reassessment of the projected costs of production of the additional capacity required to come onstream during the projection period." The World Bank said copper prices in 1990-95 should be between 71.5¢ and 78¢ a lb (1983 constant dollars), which it said were substantially lower than its own projections in 1982.

Oddly enough, a chart of free world copper consumption for the 1960-84 period shows a trendline any sales manager would be proud of. And a chart of copper inventories here and abroad shows the trendlines (finally) moving in the right direction for the producers. It's the chart of price trends that the privately-owned copper companies would like to see turned to the wall.

As the World Bank sees it, the downtrend in commercial stocks of copper and anticipated modest increase in consumption should nudge the price of copper up to an average of 70¢ a lb in 1985 from 64¢ a lb in 1984. "The market is likely to continue to be plagued with oversupply tendencies through the end of this decade and the copper price is not expected to break out of its present historical low range. In the face of the depressed market conditions experienced since 1981, copper production costs in U.S. dollar terms have been reduced substantially as a result of phasing out of high cost mines, various cost-cutting measures applied at the mines still operating, and currency devaluations by major copper-producing developing countries under debt-servicing pressures, the extent of which has substantially exceeded their domestic inflation rate."

The Bank said the pressure of debt servicing needs in Chile, Peru, Zambia, Zaire and The Philippines "are not likely to go away soon, so these countries are likely to continue to maintain exchange rate poli-

cies that will ensure the competitiveness of their export sectors.

Slower Growth

"In North America, the high cost mines are likely to remain closed and many of them are likely to be abandoned completely." The Bank said the oversupply problem could be mitigated by 1990, followed by a period in which additions to capacity would be tailored to slower-growing consumption trends once the high-cost operations had withered away.

Although the U.S. companies place themselves in the center of the cost spectrum, the World Bank scenario seems to point toward contraction of capacity in North America and more dependence on South American and African sources.

This could be one reason why the Reagan Administration (specifically the government's interagency task force on copper that worked on the copper producers' unsuccessful bid for import protection last year) has agreed to take another look at the situation. Another reason may be that the flat turn-down contrasted sharply with the treatment accorded the steel producers, on whose behalf the Administration has persuaded seven leading steel exporting countries to cut shipments to the U.S. by 30 pct this year.

The U.S. copper companies have cut production to the bone, working staffs and other expenses (one major producer reportedly was preparing to withdraw from the International Copper Research Association) to points where there is little room left. Unless the companies can improve their price realizations and recover significant shares of the copper market in their own backyard, the attrition rate could spread from mines to a company or two knocking on the door of Chapter 11. Canadian gold miner Echo Bay Mines Ltd. had less than minimal interest in the copper properties of Copper Range Co.

when it agreed to purchase Copper Range Co. from Louisiana Land & Exploration Co. last month. It wanted the gold properties and quickly said it would keep the White Pine, Mich. copper operations closed pending examination of alternatives, one of which is sale to employees of the properties, which have been idle for 2½ years.

U.S. imports of refined copper were up another 5 pct in the first 10 months of 1984 but if the November-December volume was anything like October's, the full year total easily topped 600,000 tons for a gain of 12.7 pct on 1983's 532,399 tons.

The jump in October, to 56,733 tons from 27,687 tons the month before and 32,385 tons in October 1983, marked the return of imports from Chile in volume not seen since the U.S. companies filed for protection from imports early in 1984. Chile's shipments to U.S. copper consumers were down 42 pct, or 111,904 tons, in the 10-month period. The slack was taken up by Canadian copper companies, who stepped up sales in the U.S. market by 106.7 pct, or 91,238 tons, in the period without a murmur from the U.S. companies or from Official Washington. Chile's 21,177-ton shipment to the U.S. in October came close on the heels of the September turn-down on the U.S. producers' bid for relief.

Richard de J. Osborne, president of Asarco, Inc., has calculated that the Administration's misreading of market reaction to its no-relief decision was costly to Chilean and other foreign producers as well as to the U.S. copper industry. Noting in a year-end statement that the copper price went down about 5¢ a pound in the two months following the rejection, he said if that level were to persist, it would cost free world copper producers about \$660 million on an annual basis, of which Chile's share would be \$135 million and the U.S. share \$105 million.

Looking at the market situation, Mr. Osborne said the inventory total still is large by historic standards, but well under recent peaks and "the rate of decline indicates that

U.S. IMPORTS OF COPPER ON THE RISE AGAIN

(Short Tons)

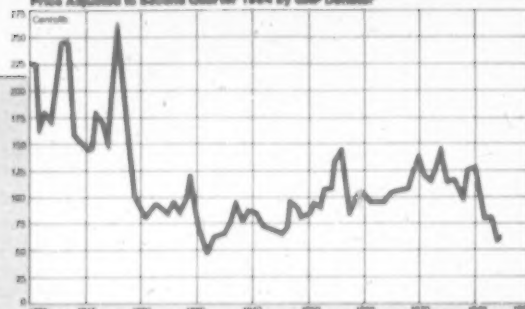
	From Chile	From Canada	From All Others
1983			
Jan.	22,711	10,474	4,170
Feb.	22,472	5,466	1,271
Mar.	26,139	16,088	6,348
Apr.	44,404	10,155	24,184
May	30,380	9,470	12,245
June	27,859	9,463	21,962
July	35,743	6,529	13,361
Aug.	22,976	6,117	25,263
Sept.	17,141	6,685	6,340
Oct.	16,671	4,903	10,811
Nov.	19,453	7,141	5,483
Dec.	11,419	7,998	2,924
1984			
Jan.	20,981	7,456	33,409
Feb.	12,832	13,085	7,486
Mar.	17,089	24,537	13,365
Apr.	19,053	31,264	14,713
May	13,850	13,775	17,132
June	12,732	19,254	21,596
July	11,663	20,127	35,677
Aug.	15,716	15,344	5,597
Sept.	9,409	14,420	3,858
Oct.	21,177	17,506	18,050

Source: American Bureau of Metal Statistics

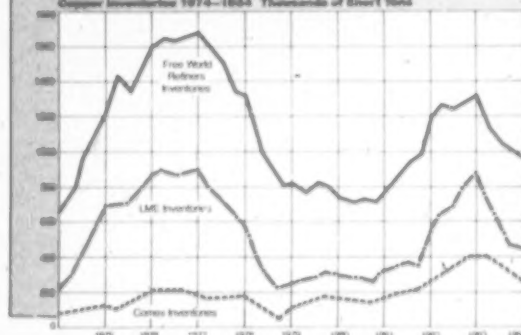
Chile was the prime supplier to U.S. customers throughout 1983 and didn't give way to Canada until early in 1984 when the U.S. producers made their vain bid for import protection. The Reagan Administration formally rejected the U.S. producers' bid in September 1984 and, as the chart shows, by October it was business as usual in the import department. Total imports, of course, were up again in 1984.



Copper Prices Have Tumbled in This Decade
Price Adjusted to Second Quarter 1984 by GNP Deflator



Inventories Have Been Brought Under Control
Copper Inventories 1974-1984 Thousands of Short Tons



Consumption Will Rise in the Future
Thousands of Short Tons



appropriate economic adjustments are at last taking place." Noting that 1984 may have been a record year for copper consumption, he said this "belies predictions forecasting the demise of the copper business. If, despite substitution of competing materials, downsizing of automobiles and shifts in investments and employment from manufacturing to service industries, the consumption peaks of each cycle are not declining and in fact may be growing, the industry will continue to have the growth which will help to absorb the excess production capacity."

The big if, he said, is supply trends. He noted that much of the capacity now shut down in the U.S. and Canada is unlikely to be reopened under any set of predictable economic assumptions. With no substantial new mine capacity being developed here or abroad, the process of rebalancing supply and demand appears to be occurring. There has been concern, Mr. Osborne said, about the expansion plans of Codelco, Chile's state-owned copper producer and the largest in the free world, because Codelco in the past "has stated a policy of capacity expansion which ignored fundamental market principles of supply and demand."

More recently, Mr. Osborne said, Codelco seems to be having second

thoughts and as recently as last October said its long-term plans to boost capacity now hinge on significant improvement in copper prices. If there has been a change in policy in Chile, the Asarco executive said, it marks an important turning point for the copper industry.

Significant Investment

The World Bank's assessment, made earlier in the year, was that many of Chile's planned additions "are likely to be delayed, given the prospect of continued economic difficulties as well as the likelihood of a fairly depressed copper market. Nevertheless, given the availability of extremely attractive and cost-competitive projects, it is possible that significant investment will take place to result in significant increases in (Chile's) capacity—250,000 metric tons by 1990 and an additional 100,000 metric tons by 1995." Chile's goal, the World Bank said, was to boost capacity from 1.25 million metric tons to over 2.2 million metric tons a year by 2000.

The World Bank's own estimates show Chile's mine capacity moving up from 1.243 million metric tons at the end of 1984 to 1.3 million metric tons next year, 1.5 million metric tons by 1990 and 1.6 million metric tons by 1995. Over that same period, U.S. capacity would shrink to

1.3 million metric tons from 1.54 million while Canadian capacity edges up to 900,000 from 870,000 metric tons.

Later this month, the new Congress is due to receive from the Commerce Department a case study of strategic resources which, among other things, asserts that the price of copper has to do better than average 75¢ a lb in 1985-86 or more domestic capacity will have to be surrendered and more copper imported. Industry sources said the study takes a harder line with foreign producers than that generated during the import quota debate last year, Chile in particular.

How much assistance this, together with the earlier decision by the government's interagency task force on copper to take another look at the industry's problems, provides in the upcoming international debate on copper production levels remains to be seen. Of more immediate importance to the U.S. copper producers, is holding out until the cavalry arrives. Copper prices on the hedge markets right up to Christmas week still were ignoring positive fundamentals, like declining inventories, declining interest rates and political problems in Chile, leaving the long-hoped-for recovery dangling just out of reach until a favorable wind pushes it closer. □

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective January 2, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	120	140	178	188
Pittsburgh	115	149	161	204
Youngstown	62	85	60	95
Lake Erie	94	114	115	135
Detroit	133	141	144	125
Chicago	344	369	418	453
Cincinnati	77	66	90	91
St. Louis	48	70	67	58
Southern	131	152	168	162
Western	61	65	62	81
U.S. Production	1,185	1,351	1,463	1,600

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80g premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50g—Pickands Mather as of 1/27/81

86.9g—U.S. Steel as of 3/15/82 Cleveland-Cliffs as of 2/26/82. Ogeboon Norton as of 3/25/82, and Hagan Mining as of 2/26/82

**Effective 8/1/83

NONFERROUS PRICES

(Effective December 28, 1984) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (IME)	N.A.	49.35	12/28/84
Copper (C)	63.00-65.00	64.00-65.00	12/20/84
Lead	20.00-23.00	21.00-23.00	12/18/84
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (IME)	N.A.	222.72	12/28/84
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	45.00	45.00-46.00	9/21/84

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode LEAD: common grade. MAGNESIUM 99.8% pig delivered. NICKEL: Avg. for last week & previous week. Canada ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$140.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.25-1.55
Calcium, ton lots, crown	\$3.58
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$308.30
Indium, dollars per troy oz.	\$3.10-3.30
Iridium, dollars per troy oz.	\$450.00
Magnesium sticks, 10,000 lbs.	\$1.97
Mercury, per 26-lb. f.o.b. N.Y.	\$315.00-328.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective January 2, 1985)

	Last Week	Two Weeks Ago	To Date 1984	To Date 1983
U.S. Steel Production				
Net tons, in thousands	1,185	1,351	90,859	82,217
Capability Utilization Rate	45.7	52.2	67.5	54.7

Composite Prices

(Effective December 28, 1984)

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base*	27.582	27.582	27.582	26.822
(¢/lb.—eff. 7/1/84)				
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.***	\$80.17	\$79.50	\$78.50	\$89.50
(Gross ton = 2240 lbs.)				
No. 2 bundles	\$51.50	\$51.50	\$51.17	\$58.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$83.50	\$81.50	\$79.50	\$96.50
No. 1 steel, Philadelphia	76.50	76.50	75.50	86.50
No. 1 steel, Chicago	80.50	80.50	80.50	85.50
No. 1 bundles, Detroit	70.50	61.50	64.50	86.50
Low Phos., Youngstown	72.50	72.50	72.50	88.50
No. 1 mach'y cast., Pgh	66.50	66.50	66.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	97.50
No. 1 mach'y cast., Chi	111.50	110.50	110.50	113.50

*Finished Steel Composite. Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite. Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite. Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$129.00
Platinum, per troy oz.	\$292.00
Rhodium, per troy oz.	\$815.00
Silver ingots, per troy oz.	\$6.36
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo)

Dec. 24—\$47.41	Dec. 27—\$46.35
Dec. 25—Holiday	Dec. 28—\$45.82
Dec. 26—\$49.65	

Scrap Prices Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turn- ing
Copper	58 1/2	49 1/2
Yellow brass	53 1/2	50
Red brass	55	47 3/4
Comm. bronze	55 1/2	48 1/4
Mang. bronze	56 1/4	45 1/2
Free cutting rod ends	51	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	45
Light copper	36

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	41
Light copper	32
No. 1 composition	45
No. 1 comp. turnings	43
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	31
Radiators	36

Aluminum		
New mixed clips	35	— 36
Old sheet	33	— 34
Old cast	33	— 34
Clean dry borings	33	— 34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	31	— 32
Mixed L.C. clips	28	— 30
Old sheets and cast	24	— 26
Borings and turnings	22	— 23
Duraluminum clippings	25	— 26

Copper and Brass

No. 1 copper wire	44	— 46
No. 2 copper wire	37	— 38
Light copper	31	— 33
Radiators	32	— 33
No. 1 composition	40	— 41
No. 1 composition turnings	37	— 38
Cocks and faucets	29	— 31
Clean heavy yellow brass	28	— 30
Brass Pipe	28	— 29
New soft brass clippings	41	— 42

Lead

Heavy soft lead	9	— 10
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 14

Nickel

Nickel solids	115	— 120
Nickel rod ends	115	— 120
Nickel sheets, clips	115	— 120
Nickel turnings	40	— 45

Zinc

New zinc clippings	18	— 19
Old diecast zinc	14	— 15

MATERIALS PRICES

EFFECTIVE DECEMBER 28, 1984

(Effective December 28, 1984) Prices standard in trade based on representative tonnages per gross ton delivered for consumer users otherwise stated. Prices are the sponsors of Iron Age editors and correspondents, based on contacts with dealers, brokers, generalists and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hot melting	\$ 85.00 to	\$ 94.00
No. 2 hot melting	73.00 to	74.00
No. 1 dealer bundles	90.00 to	91.00
No. 1 factory bundles (auto)	92.00 to	93.00
No. 2 bundles	50.00 to	51.00
No. 1 busheling	94.00 to	95.00
Machine shop turnings	10.00 to	11.00
Shoveling turnings	51.00 to	52.00
Cast iron borings	49.00 to	50.00
Low phos. punchings plate	101.00 to	102.00
Heavy turnings	71.00 to	72.00
No. 1 RR hot melting	93.00 to	94.00
Rails 2 ft. and under	107.00 to	108.00
Scrap rails, random light	91.00 to	92.00
RR specialties	97.00 to	98.00
No. 1 machinery cast	88.00 to	89.00
Capitol cast	59.00 to	60.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	570.00 to	580.00
18-8 turnings	470.00 to	480.00

Chicago

No. 1 hot melting	\$ 80.00 to	\$ 81.00
No. 2 hot melting	75.00 to	76.00
No. 1 dealer bundles	92.00 to	93.00
No. 1 factory bundles (auto)	93.00 to	94.00
No. 2 dealer bundles	57.00 to	58.00
No. 1 busheling	94.00 to	95.00
Shredder scrap	91.00 to	92.00
Machine shop turnings	43.00 to	44.00
Mixed borings and turnings	44.00 to	45.00
Shoveling turnings	48.00 to	49.00
Cast iron borings	48.00 to	49.00
Low phos. forge iron	116.00 to	117.00
Low phos. punchings plate		
1 1/4 in. and heavier	127.00 to	128.00
Low phos. 2 ft. and under	120.00 to	121.00
No. 1 RR hot melting	86.00 to	87.00
Scrap rails random light	88.00 to	89.00
Reinforcing rails	99.00 to	100.00
Rails 2 ft. and under	113.00 to	114.00
RR couplers and knuckles	90.00 to	91.00
RR car axles	123.00 to	124.00
No. 1 machinery cast	111.00 to	112.00
Capitol cast	49.00 to	50.00
Stave plate	97.00 to	98.00
Steel car wheels	100.00 to	101.00
Stainless		
18-8 bundles and solids	570.00 to	580.00
18-8 turnings	430.00 to	440.00
430 bundles and solids	135.00 to	140.00
430 turnings	105.00 to	110.00

Philadelphia

No. 1 hot melting	\$ 73.00 to	\$ 78.00
No. 2 hot melting	67.00 to	70.00
No. 1 dealer bundles	87.00 to	90.00
No. 2 dealer bundles	45.00 to	43.00
No. 1 busheling	87.00 to	90.00
Shredder scrap	76.00 to	79.00
Machine shop turnings	29.00 to	32.00
Mixed borings and turnings	38.00 to	41.00
Shoveling turnings	38.00 to	41.00
Low phos. 3 ft. and under	84.00 to	87.00
Low phos. 2 ft. punchings	110.00 to	113.00
Electric furnace bundles	78.00 to	101.00
RR specialties	87.00 to	90.00
Rails 2 ft. and under	112.00 to	115.00
Capitol cast	76.00 to	79.00
Heavy breakable cast	57.00 to	60.00
No. 1 machinery cast	77.00 to	100.00

Detroit

Brokers buying prices per gross ton on cars	\$ 53.00 to	\$ 54.00
No. 1 hot melting	52.00 to	53.00
No. 2 hot melting	70.00 to	71.00
No. 1 dealer bundles	33.00 to	34.00
No. 2 bundles	69.00 to	70.00
No. 1 busheling	42.00 to	43.00
Drop forge flashings	44.00 to	45.00
Machine shop turnings	21.00 to	22.00
Mixed borings and turnings	45.00 to	46.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	40.00 to	41.00
Heavy breakable cast	56.00 to	57.00
Mixed cupola cast	80.00 to	81.00
Automobile cast		
Stainless		
18-8 bundles and solids	445.00 to	455.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	105.00 to	115.00

Youngstown

No. 1 hot melting	\$ 59.00 to	\$ 62.00
No. 2 hot melting	42.00 to	45.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 dealer bundles	35.00 to	38.00
Machine shop turnings	11.00 to	14.00
Shoveling turnings	16.00 to	19.00
Low phos. plate	71.00 to	74.00
Electric furnace bundles	69.00 to	72.00
Galvanized bundles	59.00 to	62.00

Cleveland

No. 1 hot melting	\$ 50.00 to	\$ 53.00
No. 2 hot melting	34.00 to	37.00
No. 1 dealer bundles	62.00 to	65.00
No. 1 factory bundles	71.00 to	74.00
No. 2 bundles	19.00 to	22.00
No. 1 busheling	64.00 to	67.00
Machine shop turnings	8.00 to	9.00
Mixed borings and turnings	8.00 to	9.00
Shoveling turnings	7.00 to	10.00
Cast iron borings	10.00 to	13.00
Cast structural & plates		
2 ft. and under	100.00 to	103.00
Low phos. punchings plate	100.00 to	103.00
Drop forge flashings	35.00 to	38.00
Foundry steel 2 ft. and under	57.00 to	60.00
No. 1 RR hot melting	73.00 to	76.00
Rails 2 ft. and under	105.00 to	108.00
Rails 18 in. and under	106.00 to	109.00
Steel axle turnings	58.00 to	59.00
Railroad cast	89.00 to	91.00
No. 1 machinery cast	99.00 to	101.00
Capitol cast	55.00 to	58.00
Stave plate	41.00 to	44.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	325.00 to	335.00
430 bundles	80.00 to	85.00

Buffalo

Brokers buying prices per gross ton on cars	\$ 62.00 to	\$ 63.00
No. 1 hot melting	51.00 to	52.00
No. 2 hot melting	72.00 to	73.00
No. 1 busheling	71.00 to	72.00
No. 1 dealer bundles	36.00 to	37.00
No. 2 bundles	11.00 to	12.00
Machine shop turnings	12.00 to	13.00
Mixed borings and turnings	15.00 to	16.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	92.00 to	93.00
Low phos. plate		
Structural and plate	95.00 to	96.00
2 ft. and under	95.00 to	96.00
Rails 2 ft. and under	72.00 to	73.00
Scrap rails, random light	78.00 to	79.00
No. 1 machinery cast	58.00 to	59.00
No. 1 cupola cast		

St. Louis

No. 1 hot melting	\$ 61.00 to	\$ 62.00
No. 2 hot melting	50.00 to	51.00
Foundry steel 2 ft.	61.00 to	62.00
No. 1 dealer bundles	61.00 to	62.00
No. 2 bundles	45.00 to	46.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	23.00 to	24.00
Cast iron borings	27.00 to	28.00
No. 1 RR hot melting	61.00 to	62.00
Rails random length	65.00 to	66.00
Rails 18 in. and under	81.00 to	82.00
RR specialties	80.00 to	81.00
Capitol cast	74.00 to	75.00
Heavy breakable cast	52.00 to	53.00
Stave plate	89.00 to	90.00
Steel car wheels	94.00 to	95.00
Reinforcing rails	78.00 to	79.00
Unstripped motor blocks	61.00 to	62.00

Birmingham

No. 1 hot melting	\$ 68.00 to	\$ 69.00
No. 2 hot melting	63.00 to	64.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	69.00 to	70.00
Shredder scrap	94.00 to	95.00
Machine shop turnings	23.00 to	24.00
Shoveling turnings	38.00 to	39.00
Cast iron borings	38.00 to	39.00
Electric furnace bundles	67.00 to	68.00
Elec. furnace 3 ft. and under	68.00 to	69.00
Structural and plate 2 ft.	97.00 to	98.00
Structural and plate 4 ft.	89.00 to	90.00
No. 1 RR hot melting	89.00 to	90.00
Scrap rails, random light	85.00 to	86.00
Rails 2 ft. and under	103.00 to	104.00
Angles and splice bars	89.00 to	90.00
No. 1 cupola cast	86.00 to	87.00
Unstripped motor blocks	67.00 to	68.00

Cincinnati

Brokers buying prices per gross ton on cars	\$ 49.00 to	\$ 50.00
No. 1 hot melting	48.00 to	50.00
No. 2 hot melting	60.00 to	61.00
No. 1 dealer bundles	24.00 to	25.00
No. 2 bundles	4.00 to	5.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	17.00 to	18.00
Cast iron borings	62.00 to	63.00
Low phos. 18 in. and under	64.00 to	65.00
Rails random length	77.00 to	78.00
Rails 2 ft. and under	54.00 to	55.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	74.00 to	75.00

New York

Brokers buying prices per gross ton on cars	\$ 47.00 to	\$ 48.00
No. 1 hot melting	38.00 to	39.00
No. 2 hot melting	23.00 to	24.00
No. 1 dealer bundles	11.00 to	12.00
Mixed borings and turnings	8.00 to	9.00
Machine shop turnings	14.00 to	15.00
Shoveling turnings	35.00 to	36.00
Clean cast, chem. borings	89.00 to	90.00
No. 1 machinery cast	50.00 to	51.00
Mixed yard cast	10.00 to	12.00
Heavy breakable cast		
Stainless		
18-8 prepared solids	490.00 to	510.00
18-8 turnings	390.00 to	410.00
430 prepared solids	90.00 to	110.00
410 solids	60.00 to	90.00

Boston

Brokers buying prices per gross ton on cars	\$ 58.00 to	\$ 60.00
No. 1 hot melting	45.00 to	50.00
No. 2 hot melting	58.00 to	60.00
No. 1 dealer bundles	35.00 to	37.00
No. 2 bundles	45.00 to	47.00
No. 1 busheling	65.00 to	67.00
Shredder scrap	10.00 to	12.00
Machine shop turnings	18.00 to	20.00
Shoveling turnings	81.00 to	86.00
No. 1 machinery cast	48.00 to	50.00
Mixed cupola cast	8.00 to	10.00
Heavy breakable cast		

San Francisco

No. 1 hot melting	\$ 42.00 to	\$ 44.00
No. 2 hot melting	36.00 to	38.00
No. 1 dealer bundles	33.00 to	35.00
No. 2 dealer bundles	18.00 to	20.00
Machine shop turnings	6.00 to	8.00
Cast iron borings	8.00 to	8.00
No. 1 cupola cast	81.00 to	83.00

Los Angeles

No. 1 hot melting	\$ 45.00 to	\$ 47.00
No. 2 hot melting	38.00 to	40.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 dealer bundles	18.00 to	20.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	6.00 to	8.00
Elec. furnace 1 ft. and under	74.00 to	76.00
(bushings)	75.00 to	77.00
No. 1 cupola cast		

Seattle

No. 1 hot melting	\$ 68.00 to	\$ 69.00
No. 2 hot melting	57.00 to	59.00
No. 2 bundles	40.00 to	42.00
No. 1 cupola cast	92.00 to	93.00
Mixed yard cast	82.00 to	84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars	\$ 87.00
No. 1 hot melting	81.00
No. 2 hot melting, cut 2 ft. and under	88.00
No. 1 dealer bundles	60.00
No. 2 bundles	57.00
Mixed steel scrap	79.00
Bush new fact prep'd	31.00
Bush new fact unprep'd	33.00
Short steel turnings	25.00
Mixed borings and turnings	79.00
Cast scrap	

Houston

Brokers buying prices per gross ton on cars	\$ 69.00 to	\$ 70.00
No. 1 hot melting	58.00 to	57.00
No. 2 hot melting	42.00 to	43.00
No. 1 dealer bundles	12.00 to	13.00
Machine shop turnings	29.00 to	31.00
Crushed turnings	73.00 to	74.00
Shredder scrap	99.00 to	101.00
Cut structural plate 2 ft. and under	83.00 to	85.00
Cut structural plate 5 ft. and under	60.00 to	61.00
Unstripped motor blocks	77.00 to	78.00
Cupola cast		

FOOD AND ENERGY PUSH PRICES HIGHER

Producer prices rose in November for the first time in three months.

The surge—0.5 pct—was led by rising food and energy prices, according to the Bureau of Labor Statistics (BLS). It also marked a return to the rate that prevailed in early 1984, BLS said. Thus the 11-month run of statistics indicates inflation at the producer level running at an annual rate of 1.9 pct, about three times the rate of 1983.

Capital equipment prices increased slightly—0.2 pct—in the wake of a relatively large drop—0.6 pct—a month earlier. Unadjusted prices for autos rose 0.2 pct.

Construction machinery prices moved up after posting no change in October. And prices of pumps, compressors, and industrial process furnaces and ovens increased much more than in the previous month.

The index for intermediate materials supplies and components rose 0.3 pct from October to November on a seasonally adjusted basis. Those figures had declined slightly from June through September and then edged up in October. After falling for several months, the index for primary nonferrous metals rose.

There was no increase in November compared with October for valves and fittings while miscellaneous metal products went up 1.2 pct.

For machine tools, prices for metalcutting types rose 1.1 pct, while there were no changes in prices for metalforming tools.

Unadjusted prices for mechanical power transmission equipment fell 0.1 pct. Railroad equipment prices also declined after two consecutive months of stability, while electric motors, which were up 0.8 pct in October, dropped 0.4 pct in November.

Overall, of the 22 categories shown, 11 rose, seven were down and four were unchanged compared with October, the government said.

Latest Month Covered: November 1984

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	393.9	+ 1.1	+ 4.3
Metal Forming Machine Tools	426.8	0	+ 1.9
Agricultural Machinery & Equip.	337.2	— 0.2	+ 2.6
Construction Machinery & Equip.	360.1	+ 0.3	+ 1.8
Industrial Process Furnace & Ovens	381.8	+ 1.4	+ 3.4
Industrial Material Handling Equip.	291.4	+ 0.1	+ 1.9
Pumps, Compressors & Allied Equip.	354.3	+ 1.1	+ 2.5
Fluid Power Equip. (Dec. 1970 = 100)	261.4	0	+ 2.8
Mechanical Power Transmission Equip.	330.3	— 0.1	+ 3.6
Automobiles	223.0	+ 0.2	+ 0.5
Motor Trucks—light	290.3	+ 0.2	+ 3.7
Motor Trucks—Heavy	331.1	0	+ 4.2
Railroad Equipment	358.8	— 1.6	+ 2.9
Fabricated Metal Structural Products	313.0	— 0.3	+ 2.5
Electric Motors	341.7	— 0.4	+ 1.7
Valves & Fittings (Dec. 1982 = 100)	102.8	0	+ 2.8
Ball & Roller Bearings	345.5	+ 0.1	+ 3.4
Cutting Tools & Accessories	283.0	+ 0.5	+ 2.8
Heating Equipment	256.3	— 0.7	+ 4.4
Plumbing Fixtures & Brass Fittings	301.4	+ 0.3	+ 2.5
Metal Containers	357.5	— 0.1	+ 5.7
Miscellaneous Metal Products	301.3	+ 1.2	+ 4.1

Data based on U.S. Labor Dept.'s Producer Price Index

C2150-8

February 1, 1985

IRON AGE

MANUFACTURING MANAGEMENT

**MATERIALS 2000: ELECTRONIC MATERIALS
AND THE COMPUTER REVOLUTION
HOW MANUFACTURERS ARE BUILDING
THE 'ALL COMPOSITE' AIRPLANE**

01042122349CK
NOV 25
CONGRESSIONAL INFORMATION
SRI ACQUISITIONS
4620 EAST WEST HWY
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CHILTON'S IRON AGE

MANUFACTURING MANAGEMENT



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ONE OF THE ABC PUBLISHING COMPANIES

MATERIAL PRICES

PRICE & PRODUCTION DATA

(Effective January 7, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	148	120	147	145
Pittsburgh	162	115	184	172
Youngstown	64	62	88	76
Lake Erie	123	94	114	116
Detroit	132	133	136	101
Chicago	393	344	413	331
Cincinnati	79	77	88	66
St. Louis	63	48	71	39
Southern	156	131	164	132
Western	71	61	65	66
U.S. Production	1,391	1,185	1,470	1,251

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81.

86.9¢—U.S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay-Norton as of 3/25/82. and Hanna Mining as of 2/26/82.

**Effective 8/1/83.

STEEL PRODUCTION, COMPOSITE PRICES

(Effective January 7, 1985)

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
U.S. Steel Production				
Net tons, in thousands	1,391	1,185	1,391	1,498
Capacity Utilization Rate	54.0	45.7	54.0	57.3

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base*				
(¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	26.822
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.***				
(Gross ton = 2240 lbs.)	\$80.50	\$80.17	\$78.50	\$90.50
No. 2 bundles	\$52.17	\$51.50	\$50.50	\$58.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$83.50	\$83.50	\$79.50	\$96.50
No. 1 steel, Philadelphia	77.50	76.50	75.50	89.50
No. 1 steel, Chicago	80.50	80.50	80.50	85.50
No. 1 bundles, Detroit	70.50	70.50	61.50	86.50
Low Phos., Youngstown	72.50	72.50	72.50	88.50
No. 1 mach'y cast., Pgh	66.50	66.50	66.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	97.50
No. 1 mach'y cast., Chi	111.50	111.50	110.50	115.50

*Finished Steel Composite. Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite. Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite. Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

NONFERROUS PRICES

(Effective January 7, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	47.26	47.44	1/7/85
Copper (C)	63.00-65.00	64.00-65.00	12/20/84
Lead	19.00-23.00	20.00-23.00	1/3/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	218.30	216.90	1/7/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	45.00-48.00	45.00-48.00	9/21/84

ALUMINUM. Avg. for last week & previous week. COPPER (C) = cathode. LEAD. common grade. MAGNESIUM. 99.8% pig delivered. NICKEL. Avg. for last week & previous week. Canada ZINC. high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$140.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1,25-1.55
Calcium, ton lots, crown	\$3.58
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$298.25
Indium, dollars per troy oz.	\$3.10-3.30
Iridium, dollars per troy oz.	\$450.00
Magnesium sticks, 10,000 lbs.	\$1.97
Mercury, per 76-lb. f.o.b. N.Y.	\$313.00-322.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

Nickel electro (PDCC)	\$3.29
Palladium, per troy oz.	\$122.00
Platinum, per troy oz.	\$278.00
Rhodium, per troy oz.	\$815.00
Silver ingots, per troy oz.	\$5.795
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Dec. 31—544.76	Jan. 3—538.41
Jan. 1—Holiday	Jan. 4—538.55
Jan. 2—541.59	

Scrap Prices Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turn- ing
Copper	58 1/2	49 1/4
Yellow brass	53 1/2	50
Red brass	55	47 3/4
Comm. bronze	55 7/8	48 1/4
Mang. bronze	56 1/4	45 1/2
Free cutting rod ends	51	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	44
Light copper	35

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	40
Light copper	31
No. 1 composition	45
No. 1 comp. turnings	43
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	31
Radiators	36

Aluminum		
New mixed clips	35	— 36
Old sheet	33	— 34
Old cast	33	— 34
Clean dry borings	34	— 35

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	32	— 33
Mixed L.C. clips	28	— 30
Old sheets and cast	24	— 26
Borings and turnings	22	— 23
Duraluminum clippings	25	— 26

Copper and Brass

No. 1 copper wire	44	— 46
No. 2 copper wire	37	— 38
Light copper	31	— 33
Radiators	32	— 33
No. 1 composition	40	— 41
No. 1 composition turnings	37	— 38
Cocks and faucets	29	— 31
Clean heavy yellow brass	28	— 30
Brass Pipe	28	— 29
New soft brass clippings	41	— 42

Lead

Heavy soft lead	9	— 10
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 14

Nickel

Nickel solids	115	— 120
Nickel rod ends	115	— 120
Nickel sheets, clips	115	— 120
Nickel turnings	40	— 45

Zinc

New zinc clippings	18	— 19
Old diecast zinc	14	— 15

EFFECTIVE JANUARY 7, 1985

Effective January 7, 1985. Prices obtained in trade based on representative tonnages. Net gross for delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age Editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry as the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 83.00 to \$ 84.00
No. 2 hvy. melting	73.00 to 74.00
No. 1 dealer bundles	90.00 to 91.00
No. 1 factory bundles (auto)	92.00 to 93.00
No. 2 bundles	50.00 to 51.00
No. 1 busheling	94.00 to 95.00
Machine shop turnings	10.00 to 11.00
Shoveling turnings	51.00 to 52.00
Cast iron borings	49.00 to 50.00
Low phos. punchings plate	101.00 to 102.00
Heavy turnings	31.00 to 32.00
No. 1 RR hvy. melting	93.00 to 94.00
Rails, 2 ft. and under	107.00 to 108.00
Scrap rails, random lgh	91.00 to 92.00
RR specialties	87.00 to 88.00
No. 1 machinery cast	64.00 to 65.00
Cupola cast	59.00 to 60.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	570.00 to 580.00
18-8 turnings	470.00 to 480.00

Chicago

No. 1 hvy. melting	\$ 90.00 to \$ 91.00
No. 2 hvy. melting	75.00 to 76.00
No. 1 dealer bundles	93.00 to 94.00
No. 1 factory bundles (auto)	93.00 to 94.00
No. 2 dealer bundles	57.00 to 58.00
No. 1 busheling	91.00 to 92.00
Shredder scrap	92.00 to 93.00
Machine shop turnings	43.00 to 44.00
Mixed borings and turnings	44.00 to 45.00
Shoveling turnings	48.00 to 49.00
Cast iron borings	48.00 to 49.00
Low phos. large chop	116.00 to 117.00
Low phos. punchings plate	
1/4 in. and heavier	127.00 to 128.00
Low phos. 2 ft. and under	122.00 to 123.00
No. 1 RR hvy. melting	89.00 to 90.00
Scrap rails random lgh	89.00 to 90.00
Roller rails	102.00 to 103.00
Rails, 2 ft. and under	113.00 to 114.00
RR couplers and knuckles	94.00 to 95.00
RR car wheels	123.00 to 124.00
No. 1 machinery cast	111.00 to 112.00
Cupola cast	99.00 to 100.00
Stove plate	97.00 to 98.00
Steel car wheels	101.00 to 102.00
Stainless	
18-8 bundles and solids	510.00 to 520.00
18-8 turnings	430.00 to 440.00
430 bundles and solids	135.00 to 140.00
430 turnings	105.00 to 110.00

Philadelphia

No. 1 hvy. melting	\$ 76.00 to \$ 79.00
No. 2 hvy. melting	67.00 to 70.00
No. 1 dealer bundles	89.00 to 90.00
No. 2 dealer bundles	47.00 to 50.00
No. 1 busheling	89.00 to 92.00
Shredder scrap	98.00 to 101.00
Machine shop turnings	29.00 to 32.00
Mixed borings and turnings	29.00 to 32.00
Shoveling turnings	38.00 to 41.00
Low phos. 5 ft. and under	87.00 to 90.00
Low phos. 2 ft. punchings	110.00 to 113.00
Electric furnace bundles	98.00 to 101.00
RR specialties	87.00 to 90.00
Rails, 2 ft. and under	112.00 to 115.00
Cupola cast	76.00 to 79.00
Heavy breakable cast	57.00 to 60.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 55.00 to \$ 56.00
No. 2 hvy. melting	54.00 to 55.00
No. 1 dealer bundles	70.00 to 71.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	69.00 to 70.00
Drop large flashings	42.00 to 43.00
Machine shop turnings	44.00 to 45.00
Mixed borings and turnings	21.00 to 22.00
Shoveling turnings	45.00 to 46.00
Cast iron borings	31.00 to 32.00
Heavy breakable cast	40.00 to 41.00
Mixed cupola cast	56.00 to 57.00
Automobile cast	80.00 to 81.00
Stainless	
18-8 bundles and solids	445.00 to 455.00
18-8 turnings	350.00 to 360.00
430 bundles and solids	105.00 to 115.00

Youngstown

No. 1 hvy. melting	\$ 69.00 to \$ 72.00
No. 2 hvy. melting	52.00 to 55.00
No. 1 dealer bundles	81.00 to 84.00
No. 2 dealer bundles	35.00 to 36.00
Machine shop turnings	11.00 to 14.00
Shoveling turnings	16.00 to 19.00
Low phos. plate	71.00 to 74.00
Electric furnace bundles	69.00 to 72.00
Galvanneal bundles	59.00 to 62.00

Cleveland

No. 1 hvy. melting	\$ 57.00 to \$ 60.00
No. 2 hvy. melting	34.00 to 37.00
No. 1 dealer bundles	70.00 to 73.00
No. 1 factory bundles	79.00 to 82.00
No. 2 bundles	19.00 to 22.00
No. 1 busheling	72.00 to 75.00
Machine shop turnings	6.50 to 9.00
Mixed borings and turnings	4.00 to 6.00
Shoveling turnings	7.00 to 10.00
Cast iron borings	10.00 to 13.00
Cut structural & plates	
2 ft. and under	105.00 to 108.00
Low phos. punchings plate	105.00 to 108.00
Drop large flashings	35.00 to 38.00
Foundry steel, 2 ft. and under	57.00 to 60.00
No. 1 RR hvy. melting	73.00 to 76.00
Rails, 2 ft. and under	112.00 to 115.00
Rails, 18 in. and under	113.00 to 116.00
Steel plate turnings	56.00 to 59.00
Railroad cast	69.00 to 71.00
No. 1 machinery cast	69.00 to 71.00
Cupola cast	58.00 to 61.00
Stove plate	41.00 to 44.00
Stainless	
18-8 bundles	371.00 to 385.00
18-8 turnings	325.00 to 335.00
430 bundles	80.00 to 85.00

Buffalo

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 63.00 to \$ 64.00
No. 2 hvy. melting	52.00 to 53.00
No. 1 busheling	74.00 to 75.00
No. 1 dealer bundles	74.00 to 75.00
No. 2 bundles	37.00 to 38.00
Machine shop turnings	11.00 to 12.00
Mixed borings and turnings	12.00 to 13.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	20.00 to 21.00
Low phos. plate	94.00 to 95.00
Structural and plate	
2 ft. and under	97.00 to 98.00
Rails, 2 ft. and under	97.00 to 98.00
Scrap rails, random lgh	74.00 to 75.00
No. 1 machinery cast	80.00 to 81.00
No. 1 cupola cast	60.00 to 61.00

St. Louis

No. 1 hvy. melting	\$ 61.00 to \$ 62.00
No. 2 hvy. melting	50.00 to 51.00
Foundry steel, 2 ft.	61.00 to 62.00
No. 1 dealer bundles	61.00 to 62.00
No. 2 bundles	45.00 to 46.00
Machine shop turnings	17.00 to 18.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	27.00 to 28.00
No. 1 RR hvy. melting	61.00 to 62.00
Rails, random length	45.00 to 46.00
Rails, 18 in. and under	81.00 to 82.00
RR specialties	80.00 to 81.00
Cupola cast	74.00 to 75.00
Heavy breakable cast	52.00 to 53.00
Stove plate	89.00 to 90.00
Steel car wheels	94.00 to 95.00
Rolling rails	78.00 to 79.00
Unstripped motor blocks	61.00 to 62.00

Birmingham

No. 1 hvy. melting	\$ 71.00 to \$ 72.00
No. 2 hvy. melting	66.00 to 67.00
No. 1 dealer bundles	77.00 to 78.00
No. 2 bundles	48.00 to 49.00
No. 1 busheling	77.00 to 78.00
Shredder scrap	96.00 to 97.00
Machine shop turnings	26.00 to 27.00
Shoveling turnings	41.00 to 42.00
Cast iron borings	38.00 to 39.00
Electric furnace bundles	71.00 to 72.00
Elec. furnace, 3 ft. and under	71.00 to 72.00
Structural and plate, 2 ft.	100.00 to 101.00
No. 1 RR hvy. melting	92.00 to 93.00
Scrap rails, random lgh	87.00 to 88.00
Rails, 2 ft. and under	103.00 to 104.00
Angles and splice bars	92.00 to 93.00
No. 1 cupola cast	86.00 to 87.00
Unstripped motor blocks	67.00 to 68.00

Cincinnati

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 51.00 to \$ 52.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 dealer bundles	62.00 to 63.00
No. 2 bundles	25.00 to 26.00
Machine shop turnings	4.00 to 5.00
Shoveling turnings	4.00 to 7.00
Cast iron borings	17.00 to 18.00
Low phos. 18 in. and under	83.00 to 84.00
Rails, random length	65.00 to 66.00
Rails, 2 ft. and under	78.00 to 79.00
No. 1 cupola cast	57.00 to 58.00
Heavy breakable cast	25.00 to 26.00
Drop broke cast	75.00 to 76.00

New York

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 47.00 to \$ 48.00
No. 2 hvy. melting	38.00 to 39.00
No. 2 dealer bundles	23.00 to 27.00
Mixed borings and turnings	11.00 to 13.00
Machine shop turnings	6.00 to 7.00
Shoveling turnings	14.00 to 15.00
Clean cast, chem. borings	35.00 to 36.00
No. 1 machinery cast	89.00 to 90.00
Mixed yard cast	50.00 to 51.00
Heavy breakable cast	73.00 to 74.00
Stainless	
18-8 prepared solids	490.00 to 510.00
18-8 turnings	390.00 to 410.00
430 prepared solids	90.00 to 110.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 58.00 to \$ 60.00
No. 2 hvy. melting	48.00 to 50.00
No. 1 dealer bundles	58.00 to 60.00
No. 2 bundles	35.00 to 37.00
No. 1 busheling	65.00 to 67.00
Shredder scrap	65.00 to 67.00
Machine shop turnings	10.00 to 12.00
Shoveling turnings	18.00 to 20.00
No. 1 machinery cast	61.00 to 66.00
Mixed cupola cast	48.00 to 50.00
Heavy breakable cast	8.00 to 10.00

San Francisco

No. 1 hvy. melting	\$ 42.00 to \$ 44.00
No. 2 hvy. melting	36.00 to 38.00
No. 1 dealer bundles	33.00 to 35.00
No. 2 dealer bundles	18.00 to 20.00
Machine shop turnings	6.00 to 8.00
Cast iron borings	6.00 to 8.00
No. 1 cupola cast	81.00 to 83.00

Los Angeles

No. 1 hvy. melting	\$ 45.00 to \$ 47.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 dealer bundles	36.00 to 38.00
No. 2 dealer bundles	18.00 to 20.00
Machine shop turnings	12.00 to 14.00
Shoveling turnings	8.00 to 10.00
Cast iron borings	6.00 to 8.00
Elec. furnace, 1 ft. and under	
(foundry)	74.00 to 76.00
No. 1 cupola cast	75.00 to 77.00

Seattle

No. 1 hvy. melting	66.00 to 68.00
No. 2 hvy. melting	57.00 to 59.00
No. 2 bundles	46.00 to 48.00
No. 1 cupola cast	92.00 to 93.00
Mixed yard cast	82.00 to 84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 84.00
No. 2 hvy. melting, cut 2 ft. and under	78.00
No. 1 dealer bundles	84.00
No. 2 bundles	60.00
Mixed steel scrap	57.00
Bush. new fact. prep'd	86.00
Bush. new fact. scrap'd	75.00
Machine shop turnings	31.00
Short steel turnings	33.00
Mixed borings and turnings	25.00
Cast scrap	75.00

Houston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 72.00 to \$ 73.00
No. 2 hvy. melting	59.00 to 60.00
No. 2 bundles	44.00 to 45.00
Machine shop turnings	12.00 to 13.00
Crushed turnings	29.00 to 31.00
Shredder scrap	76.00 to 77.00
Cut structural plate, 2 ft. and under	76.00 to 77.00
Cut structural plate, 5 ft. and under	102.00 to 103.00
Unstripped motor blocks	87.00 to 88.00
Cupola cast	80.00 to 81.00

STEEL PRICES

PRODUCER KEY With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Eliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston

N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., North Tonawanda, N.Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.

S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wycokoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh
W14 Whittaker Steel Strip Div., Detroit Mich.

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gauge)	Cold-Rolled (20 gauge)	Galvanized (16 gauge)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchant)	Cold Finished	Hot-Rolled 8x20 As Rolled	Hot-Rolled 4x10 Annealed	Cold-Drawn 8x20 As Rolled	Cold-Drawn 4x10 Annealed
Atlanta	29.65	33.55	34.48	31.63	27.02	23.28	19.55	31.25	34.34	50.60	69.58	73.19
Baltimore	26.90	30.72	35.71	36.82	32.66	28.80	22.60	36.40	51.69	56.95	63.60	69.98
Birmingham	26.60	32.82	34.59	31.64	26.64	23.01	19.99	30.91	49.31	58.90	68.10	74.43
Boston	34.94	40.19	45.64	47.54	33.25	30.06	23.59	40.29	47.92	51.02	58.48	63.50
Buffalo	31.10	35.68	41.89	40.15	30.60	26.15	19.86	36.70	44.15	47.85	53.92	59.84
Chicago	28.46	34.62	37.60	32.74	22.40	22.76	18.03	28.87	37.31	41.09	46.52	52.75
Cincinnati	29.60	34.58	37.16	30.85	23.14	20.75	17.96	32.96	37.16	42.54	46.63	52.44
Cleveland	28.48	34.22	37.48	36.74	23.60	25.56	19.60	36.35	38.19	44.50	47.48	53.93
Denver	31.44	38.19	36.22	37.09	27.40	25.80	20.10	43.00	50.55	57.95	65.95	70.19
Detroit	29.21	35.20	37.87	31.39	23.13	23.14	16.96	32.71	37.18	42.51	46.81	53.49
Houston	27.67	28.71	31.69	39.21	26.73	27.73	22.60	40.15	45.96	52.87	58.95	66.14
Kansas City	30.72	36.98	39.70	34.01	27.10	22.95	17.90	33.12	39.60	45.40	49.73	54.87
Los Angeles	27.01	31.33	37.84	34.31	28.39	32.31	26.07	38.05	50.88	57.10	63.15	70.64
Memphis	26.37	32.51	35.34	33.57	27.75	26.63	21.40	33.87	36.78	49.96	59.80	69.44
Milwaukee	28.76	34.19	36.99	33.06	23.79	25.12	17.58	29.01	36.58	41.65	45.66	52.60
New York	32.47	38.99	42.55	43.38	32.66	25.31	21.06	40.05	40.90	46.40	51.84	55.34
Philadelphia	28.10	38.99	41.23	43.50	31.05	28.11	18.99	36.44	45.80	50.25	60.22	65.42
Pittsburgh	35.27	40.97	45.23	43.45	37.60	30.44	21.29	28.74	38.43	44.64	49.90	54.10
Portland	28.96	32.08	38.73	36.93	32.88	34.78	27.87	44.85	49.78	57.74	70.44	.....
San Francisco	26.94	31.55	37.04	34.48	27.78	30.19	25.65	38.70	50.70	57.69	63.90	70.05
Seattle	23.61	30.12	36.65	32.95	22.02	27.32	25.81	39.14	53.03	61.70	69.75	74.63
Spokane	21.21	30.42	35.65	38.02	35.00	33.77	21.97	43.01	43.20	47.52	.....	58.32
St. Louis	29.11	34.60	37.31	34.59	23.89	22.90	18.15	33.87	38.12	43.51	47.85	53.69
St. Paul	28.87	33.61	35.61	38.36	23.81	23.73	17.70	33.96	37.52	42.72	47.09	53.31

Base Quantities. All HR products may be combined for quantity: Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—1/8" x 1", Plate 1/4" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds 3/4-2-15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1-5/8" round; Cold drawn—1" round; Hot-rolled 4140—1-5/8" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

STEEL PRICES

Codes identify Producers listed on p. 60. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A.=Not available.

Billets, Blooms, Slabs

(Dollars per net ton)	
Carbon Re-rolling, Midwest	
W5	\$366.00
N4	\$366.00
West	
C6	\$346.00
Carbon Forging, East	
B3(2), C10, U1	\$473.00
R3	\$453.00
Midwest	
R3, W5	\$453.00
S1, U1, I3	\$473.00
C10	\$473.00
K2	\$473.00
West	
B3(2)	\$463.00
C6	\$453.00
Alloy, East	
R3	\$492.00
B3, U1, C10	\$512.00
Midwest	
W5	\$492.00
U1, C10, I3	\$512.00
R3	\$492.00
S1	\$512.00
West	
B3	\$502.00
C6	\$469.00

Piling Sheet Steel

(cents per lb)	
Midwest	
U1	\$ 26.45

Structurals

Carbon, East	
B3	\$ 22.90
U1, J3	\$ 23.90
Midwest	
C20	\$ 22.90
W8	\$ 22.90
I3, T10, U1, N4	\$ 23.90
West	
C6	\$ 25.10
B3(2)	\$ 21.65
South	
C16, U1	\$ 23.90
T10	\$ 22.90
A8	\$ Cmp.
High-Strength, Low Alloy, East	
B3	\$ 22.90
U1, J3	\$ 23.90
Midwest	
N4	\$ 23.90
W8	\$ 24.15
U1	\$ 23.90
I3	\$ 23.90
West	
B3	\$ 21.65
South	
U1, C16	\$ 23.90
Wide Flange, Carbon, East	
B3	\$ 22.90
U1, J3	\$ 23.90
Midwest	
U1	\$ 23.90
N4	\$ 23.90
I3	\$ 23.90
West	
C6	\$ 24.15

Strip

Hot-Rolled, Carbon, Cut II	
Edge—all widths, East	
U1, B3	\$ 23.75
J3	\$ 22.05
Midwest	
D1	\$ 22.05
I4	\$ 22.85
J3, W3	\$ 22.05
G2, G3	\$ 23.45
N4	\$ 22.55
W5, S1, A7	\$ 23.75
U1, B3, I3	\$ 22.75
M2, R3	\$ 22.05

West	
B3	\$ 26.55
South	
R3	\$ 22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	\$ 29.75
S10	\$ 29.60
P15	\$ 24.80
B4	\$ 36.60
G6	\$ 36.175
Midwest	
I4	\$ 38.30
W14	\$ 32.80
J4	\$ 34.05
S1	\$ 37.05
High-Strength, Hot-Rolled, Low Alloy, Cut	
Edge & Mill Edge—all widths, (plus extras)*	
Midwest	
M2, R3, W3, J3, I3	\$ 22.05
G2, G3	\$ 23.45
S1	\$ 23.75
A7	\$ 25.35
South	
R3	\$ 22.05
High-Strength, Cold-Rolled, Low Alloy, Mill	
Edge	
Midwest	
S1	\$ 37.05
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	\$ 26.10
I4	\$ 25.20
Alloy, Cold-Rolled, East (plus extras)*	
E4, M8	\$ 43.35
B4	\$ 47.25
P15	\$ 32.10
Midwest	
I4	\$ 44.30
S1	\$ 44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Hyvri), East	
B3	\$ 23.75
J3	\$ 22.05
U1	\$ 23.75
Midwest	
M2, R3, W3	\$ 22.05
D1, J3	\$ 22.05
G2, G3	\$ 23.45
I4	\$ 22.45
U1, W5, S1, B3, I3, A7	\$ 23.75
West	
U1	\$ 24.25
South	
R3	\$ 22.05
Cold-Rolled, East, Class I	
B3(2)	\$ 28.15
J3	\$ 26.15
U1	\$ 28.15
Midwest	
R3, M2, W3	\$ 26.15
G2, G3, M11	\$ 27.85
I4	\$ 22.00
J3	\$ 26.15
D1	\$ 26.15
U1, W5, S1, B3, I3, A7	\$ 28.15
West	
U1	\$ 28.65
South	
R3	\$ 24.65
Galvanized (hot-dipped), East	
B3(2)	\$ 30.30
U1	\$ 30.30
Midwest	
J3, D1, W3	\$ 28.00
R3, Y1	\$ 28.00
G2, M11	\$ 30.00
U1, W5, S1, I3, A7	\$ 30.30
West	
U1	\$ 30.80
South	
R3	\$ 28.00
Enameling, Midwest	
U1, S1, I3, A7	\$ 29.65
J3	\$ 27.65
Long-Term, Midwest	
W5, A7	\$ 31.65
U1	\$ 31.65
R3	\$ 29.35

Wire Rod

East	
B3(2)	\$ 22.35
Midwest	
N4, K2	\$ 22.35
U1	\$ 24.10
A7	\$ 22.00

West	
C6	\$ 21.45
South	
G7	\$ 22.35

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
per base box	
East	
J3	\$ 26.29
U1	\$ 27.74
B3	\$ 27.54
Midwest	
U1	\$ 27.74
J3	\$ 26.29
M11	\$ 27.24
W3	\$ 26.29
W5	\$ 27.74
West	
U1	\$ 28.24
South	
U1	\$ 27.74
Double Reduced (55 lb)**	
Midwest	
M11	\$ 21.87
J3	\$ 21.49
U1	\$ 22.37
W3	\$ 21.49
W5	\$ 22.37
West	
U1	\$ 22.87
South	
U1	\$ 22.37
Black Plate	
Single Reduced (75 lb)*	
East	
B3	\$ 24.31
Midwest	
J3	\$ 24.01
I3, W5	\$ 24.57
W3	\$ 24.01
U1, M11	\$ 25.26
West	
U1	\$ 25.26
Double Reduced (55 lb)	
East	
B3	\$ 20.49
Midwest	
M11	\$ 19.70
W5	\$ 19.70
J3	\$ 18.93
W3	\$ 18.93
U1	\$ 19.70
West	
U1	\$ 19.70
South	
U1	\$ 19.70
*70 lb—base weight extra 45¢	
**50 lb—base weight extra \$1.40	

Bars

Carbon Steel, Hot-Rolled	
(Special quality)	
East	
R3, K3	\$ 25.80
R5	\$ 25.80
J3	\$ 25.80
U1, C10, B3(3)	\$ 27.05
Midwest	
I4	\$ 23.95
U1, I3	\$ 27.05
R3, T10, C20, N4	\$ 25.80
K2	\$ 25.80
I3	\$ 22.00
A7	\$ 20.25
West	
B3	\$ 25.80
C6	\$ 24.45
South	
A8	\$ 20.65
C16	\$ 25.80
Cold-Finished Carbon, East	
A11	\$ 22.15
R3	\$ 33.75
T11, S8	\$ 31.00
J3(4), L2	\$ 31.00
M8, W10	\$ 31.00
N1	\$ 24.475
R4	\$ 33.25
B4	\$ 33.25
C10	\$ 31.00
Midwest	
W10, R3, M9	\$ 33.25
J3	\$ 31.00

B1	\$ 33.45
L2	\$ 30.75
N9	\$ 31.00
W14	\$ 22.20
B5	\$ 34.75
West	
R3	\$ 37.15
South	
J3	\$ 34.00
C16	\$ 24.40
J3	\$ 31.95
Alloy, Hot-Rolled, East	
R5, K3	\$ 27.95
R3, J3	\$ 27.95
U1, B3(2), C10	\$ 29.20
Midwest	
R3	\$ 27.95
I3, C10, U1	\$ 29.20
I4	\$ 26.10
I3	\$ 23.50
A7	\$ 20.25
West	
B3	\$ 27.95
C6	\$ 26.60
South	
A8	\$ 22.00
Alloy, Hot-Rolled, East	
L2	\$ 35.20
R3, N1	\$ 37.90
R4	\$ 37.10
AF11	\$ 30.50
J3, W10, L2	\$ 34.85
T11, S8	\$ 34.85
C10	\$ 34.85
Midwest	
R3	\$ 37.35
J3, W10, C10	\$ 34.85
B1	\$ 37.30
N9	\$ 34.85
L2	\$ 34.85
B5	\$ 38.60
M9	\$ 37.10
West	
R3	\$ 40.75
South	
J3	\$ 35.85
C16	\$ 28.00

Plates

Carbon Steel, East	
B3	\$ 23.25
I4, U1	\$ 25.75
P2	\$ 23.25
J3	\$ 26.75
Midwest	
B3	\$ 23.25
I3	\$ 25.75
J3, A7	\$ 22.80
U1, I4, S1	\$ 25.75
R3	\$ 26.75
West	
C6	\$ 24.25
U1, B3	\$ 25.75
O2	\$ 23.00
South	
R3	\$ 25.75
U1	\$ 25.75
Alloy East	
B3	\$ 31.05
U1, I4	\$ 33.55
P2	\$ 33.55
J3	\$ 34.55
Midwest	
B3	\$ 31.05
G2, G3	\$ 33.55
I4, U1	\$ 33.55
West	
B3	\$ 33.55
O2	\$ 31.00
South	
U1	\$ 33.55

Wire

Carbon Steel Wire, East	
B3	\$ 27.10
A11	\$ 22.15
Midwest	
R3	\$ 24.60
N4, W7	\$ 27.40
K2	\$ 27.40
South	
A8	\$ 22.85
West	
C6	\$ 24.95

ORDERS TRENDING UPWARD AGAIN

Up went the economy in November, causing some confusion among analysts.

After three months of declines in new orders for manufactured goods, they went up in November causing "experts" to return to their data boards for help. "Yes, businesses have been cautious," conceded Robert Ortner, U.S. Commerce Department economist, "but things are trending upward again."

Overall orders for manufactured goods rose 4.3 pct in November compared with October to \$193.8 billion, the Commerce Department reported. It was the largest increase in 17 months, the government said. At the same time inventories dropped slightly—0.1 pct—after having risen for 10 consecutive months. Mr. Ortner said the inventory decline showed that businesses were being cautious and "avoiding any unnecessary pileup they would have to unload later."

November new orders for durable goods rose 7.7 pct to \$103.5 billion compared with \$96.1 billion in October. After 11 months, gains lead declines, six months to five.

Capital goods orders in both non-defense and defense industries rose in November. The former category—a key indicator of business investment plans—rose 8.3 pct to \$27.5 billion. Defense industries capital goods orders rose an even 100 pct to \$9.8 billion from \$4.9 billion in October.

In metalworking, machine tools total orders in November continued an erratic pattern, dropping 33.7 pct to \$212.1 million.

Primary metals orders rose 1.9 pct for the second consecutive month, reaching \$10.8 billion.

Of the 24 new orders categories shown, 14 were up in November, seven were down and three were unchanged.

Billions of Dollars, Seasonally adjusted
Monthly Total, unless otherwise noted
Source: U.S. Dept of Commerce

		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	3rd Qtr.	\$316.2	\$303.8	\$270.0
Manufacturing, Total	3rd Qtr.	135.5	126.0	111.1
Manufacturing, Durable Goods	3rd Qtr.	64.8	58.3	53.0
Mining Industry	3rd Qtr.	13.2	13.3	11.9
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	Nov.	103.5	96.1	96.7
Shipments	Nov.	101.7	100.4	92.4
Inventories	Nov.	190.3	190.5	171.0
Unfilled Orders	Nov.	346.2	344.4	321.4
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	Nov.	27.5	25.4	24.7
Capital Goods Producers, Defense Industries	Nov.	9.8	4.9	7.9
Primary Metals, Total	Nov.	10.8	10.6	11.7
Steel (SIC 331)	Nov.	4.6	4.6	4.5
Iron & Steel Castings (SIC 332)	Nov.	1.2	1.2	1.3
Nonferrous Metals	Nov.	5.0	4.8	5.9
Nonelectrical Mach.-Equip. Industries, Total	Nov.	18.1	17.0	16.1
Engines & Turbines	Nov.	1.3	0.7	1.2
Farm Machinery & Equipment (Shipments)	Nov.	0.8	1.0	1.1
Construction, Mining & Mat. Hdlg. Equip	Nov.	2.7	2.9	2.7
General Industrial Machinery	Nov.	1.5	1.4	1.2
Fluid Power Equipment** (Index-1972=100)	Nov.	267.0	304.0	289.0
Metalworking Machinery	Nov.	1.1	0.8	0.7
Machine Tools, Total (\$Mill., Unadjusted)***	Nov.	212.1	283.6	160.2
Machine Tools, Metalcutting***	Nov.	160.2	191.8	115.3
Machine Tools, Metalforming***	Nov.	52.0	91.8	44.9
Electrical Mach. & Equip. Industries, Total	Nov.	15.0	14.6	14.5
Elec. Transmission Equip. & Ind. Apparatus	Nov.	2.0	2.1	1.8
Household Appliances	Nov.	1.3	1.4	1.3
Communication Equipment	Nov.	5.1	4.8	4.7
Transportation Equip. Industrial, Total	Nov.	28.1	21.9	24.8
Motor Vehicles & Parts (Shipments)	Nov.	16.7	15.9	14.3
Aircraft, Missiles & Parts	Nov.	9.8	5.3	7.7
Shipbuilding & Military Tanks	Nov.	1.2	0.5	1.8
Fabricated Metal Products, Total	Nov.	12.2	12.1	11.0
Instruments, Total	Nov.	4.7	4.7	4.2

*Est.—Commerce Dept; **Source: National Fluid Power Ass.; ***Source: NMTBA

IRON AGE

MANUFACTURING MANAGEMENT

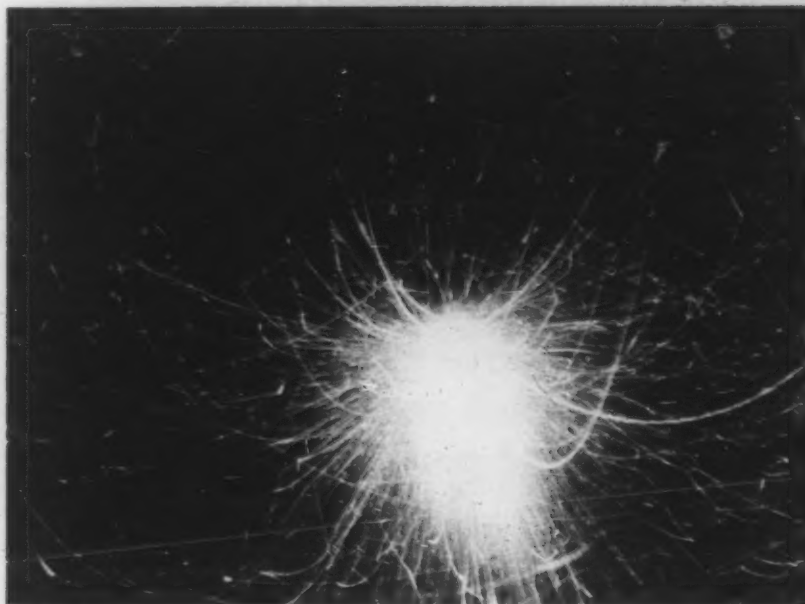
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COMPUTERS DRIVE A REVOLUTION
AT GM RESEARCH

WHAT'S BEHIND
THE DEATH OF DISC AND THE BIRTH OF FSC
EXCLUSIVE INTERVIEW—DAVID HOAG AT THE
HELM OF LTV STEEL

CHILTON'S IRON AGE

MANUFACTURING MANAGEMENT



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ONE OF THE ABC PUBLISHING COMPANIES

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective January 21, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	160	162	140	206
Pittsburgh	184	191	149	253
Youngstown	97	88	85	111
Lake Erie	139	140	114	130
Detroit	136	139	141	145
Chicago	439	410	369	517
Cincinnati	82	83	66	93
St. Louis	77	76	70	84
Southern	154	171	152	184
Western	82	71	65	69
U.S. Production	1,550	1,531	1,351	1,802

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80 Slt—Pickands Mather as of 1/27/81

86.9%—U.S. Steel as of 3/15/82 Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82 and Hanna Mining as of 2/26/82

**Effective 8/1/83

NONFERROUS PRICES

(Effective January 21, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	49.62	47.41	1/21/85
Copper (C)	65.00- 66.00	64.00- 66.00	1/21/85
Lead	18.00- 21.00	18.00- 23.00	1/16/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	220.64	218.57	1/21/85
Titanium Sponge	555.00- 585.00	555.00	4/29/82
Zinc	43.00- 45.00	45.00	1/15/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. Canada. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$140.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.25-1.55
Calcium, ton lots, crown	\$3.58
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per tray oz.	\$307.25
Indium, dollars per tray oz.	\$3 10-3.30
Iridium, dollars per tray oz.	\$465.00
Magnesium sticks, 10,000 lbs.	\$1.97
Mercury, per 76-lb. f.o.b. N.Y.	\$313.00-322.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective January 21, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,550	1,531	4,075	4,446
Capability Utilization Rate	60.1	59.4	58.2	65.5

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base*	27.582	27.582	27.582	26.822
(¢/lb.—eff. 7/1/84)				
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$ 81.50	\$ 80.50	\$ 79.50	\$ 93.17
No. 2 bundles	\$ 53.50	\$ 52.83	\$ 51.50	\$ 60.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$ 83.50	\$ 83.50	\$ 81.50	\$ 97.50
No. 1 steel, Philadelphia	80.50	77.50	76.50	91.50
No. 1 steel, Chicago	80.50	80.50	80.50	90.50
No. 1 bundles, Detroit	70.50	70.50	61.50	95.50
Low Phos., Youngstown	72.50	72.50	72.50	97.50
No. 1 mach'y cast., Pgh	66.50	66.50	66.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	100.50
No. 1 mach'y cast., Chi	111.50	111.50	110.50	111.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per tray oz.	\$118.00
Platinum, per tray oz.	\$274.00
Rhodium, per tray oz.	\$935.00
Silver ingots, per tray oz.	\$6.275
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Jan. 14—\$30.75	Jan. 17—\$30.61
Jan. 15—\$30.48	Jan. 18—\$30.61
Jan. 16—\$30.61	

Scrap Prices Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	58 1/2	48
Yellow brass	53 1/2	50
Red brass	55	47 3/4
Comm. bronze	55 3/8	48 1/4
Mang. bronze	56 1/4	45 1/2
Free cutting rod ends	51	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	46
Light copper	37

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	51
No. 2 copper wire	42
Light copper	33
No. 1 composition	46
No. 1 comp. turnings	44
Hvy. yellow brass solids	34
Hvy. yellow brass turnings	32
Radiators	38

Aluminum		
New mixed clips	35	— 36
Old sheet	33	— 34
Old cast	33	— 34
Clean dry borings	34	— 35

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	31	— 32
Mixed L.C. clips	27	— 28
Old sheets and cast	24	— 26
Borings and turnings	22	— 23
Duraluminum clippings	25	— 26

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 38
Light copper	32	— 33
Radiators	32	— 33
No. 1 composition	40	— 41
No. 1 composition turnings	37	— 38
Cocks and faucets	29	— 31
Clean heavy yellow brass	28	— 29
Brass Pipe	28	— 29
New soft brass clippings	41	— 42

Lead

Heavy soft lead	9	— 10
Whale batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 14

Nickel

Nickel solids	115	— 120
Nickel rod ends	115	— 120
Nickel sheets, clips	115	— 120
Nickel turnings	40	— 45

Zinc

New zinc clippings	18	— 19
Old diecast zinc	14	— 15

EFFECTIVE JANUARY 21, 1985

(Effective January 21, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 83.00 to	\$ 84.00
No. 2 hvy. melting	73.00 to	74.00
No. 1 dealer bundles	93.00 to	94.00
No. 1 factory bundles (auto)	92.00 to	93.00
No. 2 bundles	50.00 to	51.00
No. 1 busheling	94.00 to	95.00
Machine shop turnings	10.00 to	11.00
Shoveling turnings	51.00 to	52.00
Cast iron borings	49.00 to	50.00
Low phos. punchings plate	101.00 to	102.00
Heavy turnings	71.00 to	72.00
No. 1 RR hvy. melting	93.00 to	94.00
Rails, 2 ft. and under	107.00 to	108.00
Scrap rails, random lgh	91.00 to	92.00
RR specialties	97.00 to	98.00
No. 1 machinery cast	64.00 to	67.00
Capitol cast	59.00 to	60.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	570.00 to	580.00
18-8 turnings	470.00 to	480.00

Chicago

No. 1 hvy. melting	\$ 80.00 to	\$ 81.00
No. 2 hvy. melting	75.00 to	76.00
No. 1 dealer bundles	96.00 to	97.00
No. 1 factory bundles (auto)	93.00 to	94.00
No. 2 dealer bundles	59.00 to	60.00
No. 1 busheling	93.00 to	94.00
Shredder scrap	94.00 to	95.00
Machine shop turnings	43.00 to	44.00
Mixed borings and turnings	44.00 to	45.00
Shoveling turnings	48.00 to	49.00
Cast iron borings	48.00 to	49.00
Low phos. large crop	114.00 to	117.00
Low phos. punchings plate		
1/4 in. and heavier	127.00 to	128.00
Low phos. 2 ft. and under	122.00 to	123.00
No. 1 RR hvy. melting	94.00 to	95.00
Scrap rails random lgh	92.00 to	93.00
Roller rails	107.00 to	108.00
Rails, 2 ft. and under	114.00 to	117.00
RR couplers and knuckles	99.00 to	100.00
RR car axles	124.00 to	127.00
No. 1 machinery cast	111.00 to	112.00
Capitol cast	99.00 to	100.00
Stove plate	97.00 to	98.00
Steel car wheels	104.00 to	105.00
Stainless		
18-8 bundles and solids	510.00 to	520.00
18-8 turnings	430.00 to	440.00
430 bundles and solids	135.00 to	140.00
430 turnings	105.00 to	110.00

Philadelphia

No. 1 hvy. melting	\$ 79.00 to	\$ 82.00
No. 2 hvy. melting	69.00 to	72.00
No. 1 dealer bundles	90.00 to	93.00
No. 2 dealer bundles	49.00 to	52.00
No. 1 busheling	90.00 to	93.00
Shredder scrap	100.00 to	103.00
Machine shop turnings	29.00 to	32.00
Mixed borings and turnings	29.00 to	32.00
Shoveling turnings	38.00 to	41.00
Low phos. 5 ft. and under	89.00 to	92.00
Low phos. 2 ft. punchings	110.00 to	113.00
Electric furnace bundles	98.00 to	101.00
RR specialties	98.00 to	101.00
Rails, 2 ft. and under	112.00 to	115.00
Capitol cast	77.00 to	80.00
Heavy breakable cast	57.00 to	60.00
No. 1 machinery cast	27.00 to	30.00

Detroit

Brokers buying prices per gross ton on cars	\$ 55.00 to	\$ 56.00
No. 1 hvy. melting	54.00 to	55.00
No. 2 hvy. melting	70.00 to	71.00
No. 1 dealer bundles	33.00 to	34.00
No. 2 bundles	69.00 to	70.00
No. 1 busheling	42.00 to	43.00
Drop forge flashings	44.00 to	45.00
Machine shop turnings	21.00 to	22.00
Mixed borings and turnings	45.00 to	46.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	40.00 to	41.00
Heavy breakable cast	36.00 to	37.00
Mixed capitol cast	80.00 to	81.00
Automobile cast		
Stainless		
18-8 bundles and solids	445.00 to	455.00
18-8 turnings	350.00 to	360.00
430 bundles and solids	105.00 to	115.00

Youngstown

No. 1 hvy. melting	\$ 49.00 to	\$ 72.00
No. 2 hvy. melting	52.00 to	55.00
No. 1 dealer bundles	81.00 to	84.00
No. 2 dealer bundles	35.00 to	38.00
Machine shop turnings	11.00 to	14.00
Shoveling turnings	16.00 to	19.00
Low phos. plate	71.00 to	74.00
Electric furnace bundles	69.00 to	72.00
Galvanized bundles	59.00 to	62.00

Cleveland

No. 1 hvy. melting	\$ 57.00 to	\$ 60.00
No. 2 hvy. melting	34.00 to	37.00
No. 1 dealer bundles	70.00 to	73.00
No. 1 factory bundles	79.00 to	82.00
No. 2 bundles	19.00 to	22.00
No. 1 busheling	72.00 to	75.00
Machine shop turnings	6.00 to	9.00
Mixed borings and turnings	6.00 to	9.00
Shoveling turnings	7.00 to	10.00
Cast iron borings	10.00 to	13.00
Cut structural & plates		
2 ft. and under	105.00 to	108.00
Low phos. punchings plate	105.00 to	108.00
Drop forge flashings	35.00 to	38.00
Fouged steel, 2 ft. & under	57.00 to	60.00
No. 1 RR hvy. melting	73.00 to	76.00
Rails, 2 ft. and under	112.00 to	115.00
Rails, 18 in. and under	113.00 to	116.00
Steel coil turnings	58.00 to	59.00
Railroad cast	89.00 to	91.00
No. 1 machinery cast	94.00 to	101.00
Capitol cast	55.00 to	56.00
Stove plate	41.00 to	44.00
18-8 bundles	375.00 to	385.00
18-8 turnings	325.00 to	335.00
430 bundles	80.00 to	85.00

Buffalo

Brokers buying prices per gross ton on cars	\$ 63.00 to	\$ 64.00
No. 1 hvy. melting	52.00 to	53.00
No. 2 hvy. melting	74.00 to	75.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 bundles	37.00 to	38.00
Machine shop turnings	11.00 to	12.00
Mixed borings and turnings	12.00 to	13.00
Shoveling turnings	17.00 to	18.00
Cast iron borings	20.00 to	21.00
Low phos. plate	94.00 to	95.00
Structural and plate		
2 ft. and under	97.00 to	98.00
Rails, 2 ft. and under	97.00 to	98.00
Scrap rails, random lgh	74.00 to	75.00
No. 1 machinery cast	80.00 to	81.00
No. 1 capitol cast	60.00 to	61.00

St. Louis

No. 1 hvy. melting	\$ 61.00 to	\$ 62.00
No. 2 hvy. melting	50.00 to	51.00
Foundry steel, 2 ft	41.00 to	42.00
No. 1 dealer bundles	61.00 to	62.00
No. 2 bundles	45.00 to	46.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	23.00 to	24.00
Cast iron borings	22.00 to	23.00
No. 1 RR hvy. melting	61.00 to	62.00
Rails, random length	65.00 to	66.00
Rails, 18 in. and under	81.00 to	82.00
RR specialties	80.00 to	81.00
Capitol cast	74.00 to	75.00
Heavy breakable cast	52.00 to	53.00
Stove plate	89.00 to	90.00
Steel car wheels	94.00 to	95.00
Knifing rails	78.00 to	79.00
Unshipped motor blocks	41.00 to	42.00

Birmingham

No. 1 hvy. melting	\$ 71.00 to	\$ 72.00
No. 2 hvy. melting	64.00 to	67.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 bundles	48.00 to	49.00
No. 1 busheling	74.00 to	75.00
Shredder scrap	94.00 to	97.00
Machine shop turnings	26.00 to	27.00
Shoveling turnings	41.00 to	42.00
Cast iron borings	36.00 to	39.00
Electric furnace bundles	71.00 to	72.00
Elec. furnace, 3 ft. & under	71.00 to	72.00
Structural and plate, 2 ft	100.00 to	101.00
Structural and plate, 4 ft	92.00 to	93.00
No. 1 RR hvy. melting	92.00 to	93.00
Scrap rails, random lgh	87.00 to	88.00
Rails, 2 ft. and under	103.00 to	104.00
Angles and splice bars	92.00 to	93.00
No. 1 capitol cast	66.00 to	67.00
Unshipped motor blocks	67.00 to	68.00

Cincinnati

Brokers buying prices per gross ton on cars	\$ 51.00 to	\$ 52.00
No. 1 hvy. melting	50.00 to	51.00
No. 2 hvy. melting	67.00 to	63.00
No. 1 dealer bundles	25.00 to	26.00
No. 2 bundles	4.00 to	5.00
Machine shop turnings	6.00 to	7.00
Shoveling turnings	17.00 to	18.00
Cast iron borings	63.00 to	64.00
Low phos. 18 in. and under	63.00 to	64.00
Rails, random length	76.00 to	77.00
Rails, 2 ft. and under	57.00 to	58.00
No. 1 capitol cast	25.00 to	26.00
Heavy breakable cast	73.00 to	74.00
Drop broken cast		

New York

Brokers buying prices per gross ton on cars	\$ 47.00 to	\$ 48.00
No. 1 hvy. melting	38.00 to	39.00
No. 2 hvy. melting	33.00 to	37.00
No. 1 dealer bundles	11.00 to	13.00
Mixed borings and turnings	6.00 to	7.00
Machine shop turnings	14.00 to	15.00
Shoveling turnings	35.00 to	36.00
Clean cast, chem. borings	89.00 to	90.00
No. 1 machinery cast	50.00 to	51.00
Mixed yard cast	10.00 to	12.00
Heavy breakable cast		
Stainless		
18-8 prepared solids	490.00 to	510.00
18-8 turnings	390.00 to	410.00
430 prepared solids	90.00 to	110.00
410 solids	60.00 to	90.00

Boston

Brokers buying prices per gross ton on cars	\$ 58.00 to	\$ 60.00
No. 1 hvy. melting	48.00 to	50.00
No. 2 hvy. melting	38.00 to	40.00
No. 1 dealer bundles	35.00 to	37.00
No. 2 bundles	43.00 to	47.00
No. 1 busheling	43.00 to	47.00
Shredder scrap	10.00 to	12.00
Machine shop turnings	18.00 to	20.00
Shoveling turnings	81.00 to	86.00
No. 1 machinery cast	48.00 to	50.00
Mixed capitol cast	8.00 to	10.00
Heavy breakable cast		

San Francisco

No. 1 hvy. melting	\$ 42.00 to	\$ 44.00
No. 2 hvy. melting	36.00 to	38.00
No. 1 dealer bundles	33.00 to	35.00
No. 2 dealer bundles	18.00 to	20.00
Machine shop turnings	4.00 to	6.00
Cast iron borings	6.00 to	8.00
No. 1 capitol cast	81.00 to	83.00

Los Angeles

No. 1 hvy. melting	\$ 45.00 to	\$ 47.00
No. 2 hvy. melting	38.00 to	40.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 dealer bundles	18.00 to	20.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	8.00 to	10.00
Cast iron borings	6.00 to	8.00
Elec. furnace, 1 ft. and under	74.00 to	76.00
(foundry)		
No. 1 capitol cast	75.00 to	77.00

Seattle

No. 1 hvy. melting	\$ 66.00 to	\$ 68.00
No. 2 hvy. melting	57.00 to	59.00
No. 1 dealer bundles	40.00 to	42.00
No. 2 bundles	92.00 to	93.00
No. 1 capitol cast	82.00 to	84.00
Mixed yard cast		

Hamilton, Ont.

Brokers buying prices per gross ton on cars	\$ 56.00
No. 1 hvy. melting	78.00
No. 2 hvy. melting, cut 2 ft. and under	64.00
No. 1 dealer bundles	60.00
No. 2 bundles	57.00
Mixed steel scrap	56.00
Scrap, new fact. prep'd	75.00
Machine shop turnings	31.00
Short steel turnings	33.00
Mixed borings and turnings	25.00
Cast scrap	75.00

Houston

Brokers buying prices per gross ton on cars	\$ 72.00 to	\$ 73.00
No. 1 hvy. melting	59.00 to	60.00
No. 2 hvy. melting	44.00 to	45.00
No. 1 dealer bundles	12.00 to	13.00
Machine shop turnings	29.00 to	31.00
Crushed turnings	76.00 to	77.00
Shredder scrap	102.00 to	103.00
Cut structural plate, 2 ft. and under	66.00 to	67.00
Cut structural plate, 5 ft. and under	60.00 to	61.00
Unshipped motor blocks	80.00 to	81.00
Capitol cast		

PRICES CLOSE THE YEAR ON A LOW NOTE

Producer prices rose a minimal 0.1 pct in December continuing the year-long trend toward lower inflation.

Prices for the entire year, according to the Bureau of Labor Statistics, registered a modest 1.8 pct upturn. Capital equipment prices for all of 1984 rose 2.1 pct, just about the same as 1983.

Declining energy prices contributed to the December and 1984 overall producer price slowdown. The continued strength of the dollar, which makes imports relatively less expensive, also helped to hold down the prices of many goods that face stiff competition from abroad.

That is the opposite of the high inflation conditions that existed during the recent recessions, when the dollar was weak and oil prices were skyrocketing.

Also, industrial production in November showed its first rise in three months. September and October figures were revised downward and the effect of those drops just got into the pricing pipeline in December. The effects of the November and December industrial production won't be felt until later this quarter.

Energy prices are expected to stay much the same or, possibly, fall further. They declined 4.1 pct in 1984. That was exactly half the rate of decline in 1983, but nevertheless quite substantial.

For producers the news is mixed. Lower prices usually translate into lower profits. Manufacturers will have to continue to rely on cost-cutting rather than higher prices.

Overall, of the 22 categories shown, 12 rose, five were down and five were unchanged compared with November, the government said.

The increase in the Producer Price Index for finished goods for 1984—1.8 pct—was the third smallest rise in 20 years.

Latest Month Covered: December 1984

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	394.7	+ 0.2	+ 4.3
Metal Forming Machine Tools	428.7	+ 0.4	+ 2.3
Agricultural Machinery & Equip.	337.6	+ 0.1	+ 2.3
Construction Machinery & Equip.	360.1	— 0.5	+ 1.3
Industrial Process Furnace & Ovens	380.8	— 0.3	+ 3.1
Industrial Material Handling Equip.	292.1	+ 0.2	+ 1.8
Pumps, Compressors & Allied Equip.	352.2	— 0.6	+ 1.6
Fluid Power Equip. (Dec. 1970 = 100)	261.8	+ 0.2	+ 2.9
Mechanical Power Transmission Equip.	330.8	+ 0.2	+ 3.2
Automobiles	223.4	+ 0.2	+ 0.6
Motor Trucks—Light	289.6	— 0.2	+ 3.4
Motor Trucks—Heavy	331.2	0	+ 4.2
Railroad Equipment	358.8	0	+ 2.4
Fabricated Metal Structural Products	313.2	+ 0.1	+ 2.4
Electric Motors	342.2	+ 0.1	+ 1.8
Valves & Fittings (Dec. 1982 = 100)	102.8	0	+ 2.8
Ball & Roller Bearings	344.5	— 0.3	+ 3.3
Cutting Tools & Accessories	283.3	+ 0.1	+ 2.7
Heating Equipment	256.4	0	+ 4.4
Plumbing Fixtures & Brass Fittings	302.7	+ 0.4	+ 3.0
Metal Containers	357.5	0	+ 5.1
Miscellaneous Metal Products	301.6	+ 0.1	+ 4.1

Data based on U.S. Labor Dept.'s
Producer Price Index

CHILTON'S

C 2150-7

March 1, 1985

MANUFACTURING MANAGEMENT

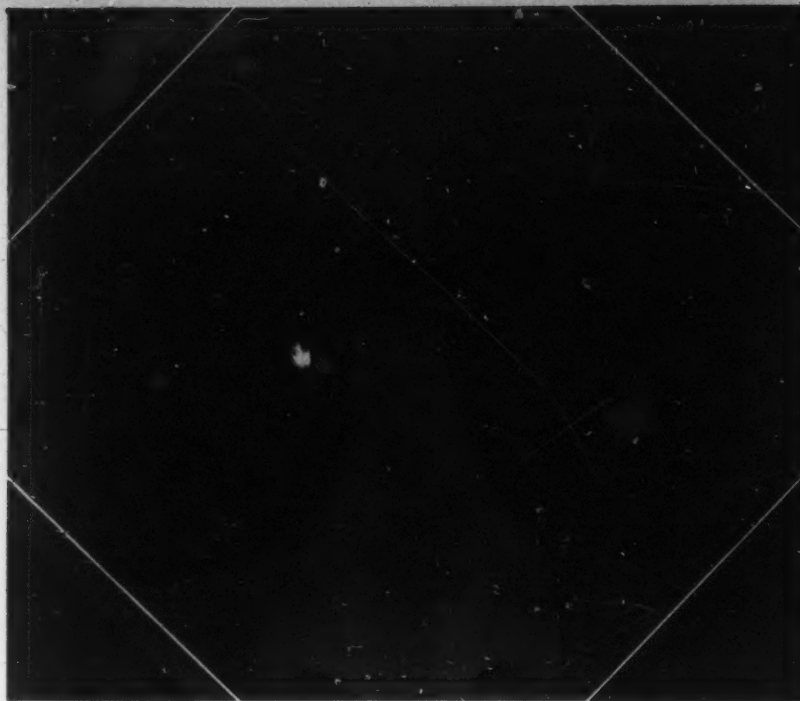


HARD CHOICES IN PLANT CONTROLS— A LOOK AT THE FIELD

ROCKWELL MOVES IN ON ALLEN-BRADLEY
MATERIALS 2000: CAD/CAM AND ADVANCED
MATERIALS DESIGN

CHILTON'S IRON AGE

MANUFACTURING MANAGEMENT



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ONE OF THE ABC PUBLISHING COMPANIES

The nation's R&D budget is expected to go up again in 1985

Expenditures for research and development in the U.S. are expected to reach \$107.3 billion in 1985, an increase of 3.9 pct over 1984. According to the annual forecast of Battelle Memorial Institute's Columbus Division, this is slightly better than the 10-year average rate of 4.2 pct in real R&D effort that has been experienced since 1974.

Industrial funding for R&D, projected to increase more significantly than government support, will account for 51.3 pct of the total funding. Industrial support is forecast to be \$55 billion, up 11.4 pct from 1984. Battelle sees an increase of 10 pct in Federal support for R&D, with funding expected to be \$48.7 billion.

The Battelle forecast noted that industry will remain the dominant performer of R&D. In 1985, performance of R&D by industry is expected to rise to almost \$80 billion, or 74.5 pct of all research performed. This compares with \$11.9 billion (11.1 pct) for the Federal government and \$12.5 billion (11.6 pct) for academic institutions.

As part of the forecast, Battelle estimated the industrial vs Federal financial support for R&D performed by several broad industrial sectors. In 1985, Battelle expects the aerospace industry to retain leadership in total R&D, with funding of about \$20 billion. Of that, 75 pct will be funded by the Federal government.

**\$107 Billion:
Total Expenditures
for 1985**

Other Nonprofit Institutions 2.8%

Federal Govt. 11.1%

Colleges and Universities 11.6%

Industry 74.5%

The electrical machinery and communications industry is forecast to have the second largest total R&D support with almost \$17 billion. Of that, two-thirds will be industrially funded.

Estimates for total R&D funds in other industries include \$9.7 billion for machinery, \$7.2 billion for automotive, \$821 million for fabricated metals and ordnance, \$497 million for iron and steel, and \$407 million for nonferrous metals. In these areas, the money is provided mainly by industry.

Production and orders on the upswing, purchasers say

Purchasing managers for leading manufacturing corporations said the business tempo picked up in January, ending the down-

ward drift during the latter months of 1984.

The National Association of Purchasing Management (NAPM) said an abrupt upward shift in production and new orders prompted some widening in commitments for production goods, although there still was a tendency to hold inventory down.

Some 25 pct of members reporting said new orders were up in January. This compares with 19 pct for December and broke a six-month decline. Declines in new orders in January were reported by 20 pct, compared with 24 pct the previous month.

Increased production in January was reported by 27 pct of those polled, while only 12 pct said output was down. This compares with 17 pct reporting higher production and 22 pct reporting lower production for December.

More members reported lower inventories than reported increases during January—19 pct to 28 pct—but the field was much narrower than in December when 18 pct reported additions to stock and 32 pct said their inventories were cut.

Lead times on production materials of two months or more were reported by 46 pct compared with 45 pct for December, but this was well under the 51 pct making longer commitments last November.

NAPM said 39 pct of members polled reported that overall price hikes for the first quarter were lower than originally budgeted and only 5 pct said they were higher.

Aluminum and steel products were among industrial commodities re-

ported down in price—particularly sheet steel—while the only items on the up side were titanium dioxide, caustic soda, sulfuric acid and tall oil. Fuel oil, gasoline, natural gas, coal, and some miscellaneous chemicals also were lower in price.

NAPM said attempts to raise prices on corrugated shipping containers apparently met resistance, as did many chemical products. Corrugated containers had been on NAPM's "up" list for six straight months until January.

Magnesium started the year with few price increases

Price hikes on magnesium were held to a few small volume alloys as 1985 got under way.

The price of primary magnesium, which over the past several years has been marked up in January more often than not, was held to \$1.48 a lb, the level reached after two 5¢ a lb hikes in January and July 1984.

The price for the key die casting grade, AZ91B, also went unchanged at a range of \$1.26 to \$1.30 a lb. Dow Magnesium, which is at the high end of the range on the die casting alloy (but grants a 4¢ a lb discount), increased its posted prices for magnesium sticks by 5¢ to \$2.02 a lb and its prices for AZ63A, AZ92A and AZ91C alloys by 5¢ to \$1.48 a lb.

The McLean, Va.-based International Magnesium Association said magnesium production worldwide rose faster than shipments last year.

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective February 4, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	163	154	148	237
Pittsburgh	198	189	162	265
Youngstown	98	96	64	114
Lake Erie	156	120	123	146
Detroit	138	122	132	150
Chicago	447	392	393	565
Cincinnati	92	83	79	94
St. Louis	76	76	63	76
Southern	169	163	156	196
Western	76	63	71	81
U.S. Production	1,613	1,458	1,391	1,934

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81

86.9¢—U.S. Steel as of 3/15/82 Cleveland-Cliffs as of 2/26/82 Oglebay Norton as of 3/25/82 and Hanna Mining as of 2/26/82

**Effective 8/1/83

NONFERROUS PRICES

(Effective February 4, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	49.75	49.76	2/4/85
Copper (C)	67.00-68.00	67.00	1/31/85
Lead	20.00-21.00	18.00-21.00	1/22/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	233.98	228.57	2/4/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	43.00	43.00-45.00	1/22/85

ALUMINUM: Avg. for last week & previous week COPPER (C) = cathode LEAD: common grade MAGNESIUM: 99.8% pig delivered NICKEL: Avg. for last week & previous week CANADA ZINC: high-grade

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$140.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$125-155
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$301.25
Indium, dollars per troy oz.	\$310.3-330
Iridium, dollars per troy oz.	\$475.00
Magnesium sticks, 10,000 lbs.	\$1.97
Mercury, per 76-lb. f.o.b. N.Y.	\$313.00-321.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective February 4, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,613	1,458	7,146	8,410
Capacity Utilization Rate	62.3	56.6	58.5	68.3

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base*	27.582	27.582	27.582	26.822
1¢/lb.—eff. 7/1/84)				
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.***				
(Gross ton = 2240 lbs.)	\$82.50	\$81.50	\$80.50	\$95.17
No. 2 bundles	\$54.50	\$53.50	\$52.17	\$61.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$86.50	\$83.50	\$83.50	\$103.50
No. 1 steel, Philadelphia	80.50	80.50	77.50	91.50
No. 1 steel, Chicago	80.50	80.50	80.50	90.50
No. 1 bundles, Detroit	75.50	75.50	70.50	101.50
Low Phos., Youngstown	72.50	72.50	72.50	104.50
No. 1 mach'y cast., Pgh	71.50	66.50	66.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	100.50
No. 1 mach'y cast., Chi	111.50	111.50	111.50	111.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing plants within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$131.00
Platinum, per troy oz.	\$283.00
Rhodium, per troy oz.	\$1,030.00
Silver ingots, per troy oz.	\$6.16
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Jan. 28—532.33	Jan. 31—530.35
Jan. 29—531.94	Feb. 1—Holiday
Jan. 30—531.27	

Scrap Prices

Brass Mill Scrap

(Cents per lb. over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	60 1/8	51 1/4
Yellow brass	54 1/4	50
Red brass	56 1/8	49 1/2
Comm. bronze	57 1/8	50
Mang. bronze	56 3/4	46 3/4
Free-cutting rod ends	51	50

Custom Smelters Scrap

(Cents per lb. carload lots del. refinery)

No. 1 copper wire	57
No. 2 copper wire	49
Light copper	40

Ingot Makers Scrap

(Cents per lb.; carload lots del. refinery)

No. 1 copper wire	53
No. 2 copper wire	45
Light copper	36
No. 1 composition	46
No. 1 comp. turnings	44
Hvy. yellow brass solids	34
Hvy. yellow brass turnings	32
Radiators	37

Aluminum		
New mixed clips	35	— 36
Old sheet	53	— 34
Old cast	33	— 34
Clean dry borings	34	— 35

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	29	— 30
Mixed L.C. clips	27	— 28
Old sheets and cast	24	— 26
Borings and turnings	22	— 23
Duraluminum clippings	25	— 26

Copper and Brass

No. 1 copper wire	46	— 47
No. 2 copper wire	38	— 39
Light copper	33	— 34
Radiators	32	— 33
No. 1 composition	40	— 41
No. 1 composition turnings	37	— 38
Cocks and faucets	30	— 32
Clean heavy yellow brass	28	— 29
Brass Pipe	28	— 29
New soft brass clippings	41	— 42

Lead

Heavy soft lead	9	— 10
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 14

Nickel

Nickel solids	115	— 120
Nickel rod ends	115	— 120
Nickel sheets, clips	115	— 120
Nickel turnings	40	— 45

Zinc

New zinc clippings	18	— 19
Old diecast zinc	14	— 15

EFFECTIVE FEBRUARY 4, 1985

(Effective February 4, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 86.00 to \$ 87.00
No. 2 hvy. melting	76.00 to 77.00
No. 1 dealer bundles	98.00 to 99.00
No. 1 factory bundles (auto)	96.00 to 97.00
No. 2 bundles	53.00 to 54.00
No. 1 busheling	98.00 to 99.00
Machine shop turnings	10.00 to 11.00
Shoveling turnings	51.00 to 52.00
Cast iron borings	49.00 to 50.00
Low phos. punchings plate	103.00 to 104.00
Heavy turnings	76.00 to 77.00
No. 1 RR hvy. melting	93.00 to 94.00
Rails, 2 ft. and under	112.00 to 113.00
Scrap rails, random lgh	94.00 to 95.00
RR specialties	102.00 to 103.00
No. 1 machinery cast	71.00 to 72.00
Cupola cast	64.00 to 65.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	570.00 to 580.00
18-8 turnings	470.00 to 480.00

Chicago

No. 1 hvy. melting	\$ 80.00 to \$ 81.00
No. 2 hvy. melting	75.00 to 76.00
No. 1 dealer bundles	98.00 to 99.00
No. 1 factory bundles (auto)	96.00 to 97.00
No. 2 dealer bundles	59.00 to 60.00
No. 1 busheling	95.00 to 96.00
Shredder scrap	94.00 to 95.00
Machine shop turnings	44.00 to 45.00
Mixed borings and turnings	45.00 to 46.00
Shoveling turnings	50.00 to 51.00
Cast iron borings	50.00 to 51.00
Low phos. large crop	116.00 to 117.00
Low phos. punchings plate	
1-4 in. and heavier	129.00 to 130.00
Low phos. 2 ft. and under	124.00 to 125.00
No. 1 RR hvy. melting	92.00 to 93.00
Scrap rails, random lgh	92.00 to 93.00
Roller rails	107.00 to 108.00
Rails, 2 ft. and under	116.00 to 117.00
RR couplers and knuckles	99.00 to 100.00
RR car axles	123.00 to 124.00
No. 1 machinery cast	111.00 to 112.00
Cupola cast	99.00 to 100.00
Stove plate	97.00 to 98.00
Steel car wheels	102.00 to 103.00
Stainless	
18-8 bundles and solids	520.00 to 530.00
18-8 turnings	440.00 to 450.00
430 bundles and solids	135.00 to 140.00
430 turnings	105.00 to 110.00

Philadelphia

No. 1 hvy. melting	\$ 79.00 to \$ 82.00
No. 2 hvy. melting	69.00 to 72.00
No. 1 dealer bundles	90.00 to 93.00
No. 2 dealer bundles	49.00 to 52.00
No. 1 busheling	90.00 to 93.00
Shredder scrap	100.00 to 103.00
Machine shop turnings	29.00 to 32.00
Mixed borings and turnings	29.00 to 32.00
Shoveling turnings	38.00 to 41.00
Low phos. 5 ft. and under	89.00 to 92.00
Low phos. 2 ft. punchings	110.00 to 113.00
Electric furnace bundles	104.00 to 107.00
RR specialties	89.00 to 92.00
Rails, 2 ft. and under	112.00 to 115.00
Cupola cast	80.00 to 83.00
Heavy breakable cast	57.00 to 60.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 58.00 to \$ 59.00
No. 2 hvy. melting	57.00 to 58.00
No. 1 dealer bundles	75.00 to 76.00
No. 2 bundles	35.00 to 36.00
No. 1 busheling	74.00 to 75.00
Drop large flashings	45.00 to 46.00
Machine shop turnings	48.00 to 49.00
Mixed borings and turnings	24.00 to 25.00
Shoveling turnings	49.00 to 50.00
Cast iron borings	31.00 to 32.00
Heavy breakable cast	46.00 to 47.00
Mixed cupola cast	56.00 to 57.00
Automobile cast	86.00 to 87.00
Stainless	
18-8 bundles and solids	465.00 to 475.00
18-8 turnings	370.00 to 380.00
430 bundles and solids	110.00 to 120.00

Youngstown

No. 1 hvy. melting	\$ 69.00 to \$ 72.00
No. 2 hvy. melting	52.00 to 55.00
No. 1 dealer bundles	81.00 to 84.00
No. 2 dealer bundles	35.00 to 38.00
Machine shop turnings	11.00 to 14.00
Shoveling turnings	16.00 to 19.00
Low phos. plate	71.00 to 74.00
Electric furnace bundles	69.00 to 72.00
Galvanized bundles	59.00 to 62.00

Cleveland

No. 1 hvy. melting	\$ 58.00 to \$ 61.00
No. 2 hvy. melting	34.00 to 37.00
No. 1 dealer bundles	73.00 to 76.00
No. 1 factory bundles	79.00 to 82.00
No. 2 bundles	22.00 to 25.00
No. 1 busheling	75.00 to 78.00
Machine shop turnings	6.00 to 9.00
Mixed borings and turnings	6.00 to 9.00
Shoveling turnings	7.00 to 10.00
Cast iron borings	10.00 to 13.00
Cut structural & plates	
2 ft. and under	105.00 to 108.00
Low phos. punchings plate	105.00 to 108.00
Drop large flashings	40.00 to 43.00
Foundry steel, 2 ft. & under	57.00 to 60.00
No. 1 RR hvy. melting	73.00 to 76.00
Rails, 2 ft. and under	112.00 to 115.00
Rails, 18 in. and under	113.00 to 116.00
Steel axle turnings	58.00 to 59.00
Railroad cast	89.00 to 91.00
No. 1 machinery cast	99.00 to 101.00
Cupola cast	55.00 to 58.00
Stove plate	41.00 to 44.00
Stainless	
18-8 bundles	375.00 to 385.00
18-8 turnings	325.00 to 335.00
430 bundles	80.00 to 85.00

Buffalo

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 63.00 to \$ 64.00
No. 2 hvy. melting	52.00 to 53.00
No. 1 busheling	74.00 to 75.00
No. 1 dealer bundles	74.00 to 75.00
No. 2 bundles	37.00 to 38.00
Machine shop turnings	16.00 to 17.00
Mixed boring and turnings	17.00 to 18.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	24.00 to 25.00
Low phos. plate	97.00 to 98.00
Structural and plate	
2 ft. and under	100.00 to 101.00
Rails, 2 ft. and under	100.00 to 101.00
Scrap rails, random lgh	74.00 to 75.00
No. 1 machinery cast	80.00 to 81.00
No. 1 cupola cast	60.00 to 61.00

St. Louis

No. 1 hvy. melting	\$ 64.00 to \$ 65.00
No. 2 hvy. melting	53.00 to 54.00
Foundry steel, 2 ft.	61.00 to 62.00
No. 1 dealer bundles	64.00 to 65.00
No. 2 bundles	48.00 to 49.00
Machine shop turnings	17.00 to 18.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	27.00 to 28.00
No. 1 RR hvy. melting	64.00 to 65.00
Rails, random length	65.00 to 66.00
Rails, 18 in. and under	81.00 to 82.00
RR specialties	80.00 to 81.00
Cupola cast	74.00 to 75.00
Heavy breakable cast	52.00 to 53.00
Stove plate	89.00 to 90.00
Steel car wheels	97.00 to 98.00
Rolling rails	78.00 to 79.00
Unstripped motor blocks	61.00 to 62.00

Birmingham

No. 1 hvy. melting	\$ 73.00 to \$ 74.00
No. 2 hvy. melting	69.00 to 70.00
No. 1 dealer bundles	77.00 to 78.00
No. 2 bundles	50.00 to 51.00
No. 1 busheling	77.00 to 78.00
Shredder scrap	99.00 to 100.00
Machine shop turnings	29.00 to 30.00
Shoveling turnings	42.00 to 43.00
Cast iron borings	39.00 to 40.00
Electric furnace bundles	74.00 to 75.00
Elec. furnace, 3 ft. & under	74.00 to 75.00
Structural and plate, 4 ft.	100.00 to 101.00
No. 1 RR hvy. melting	92.00 to 93.00
Scrap rails, random lgh	92.00 to 93.00
Rails, 2 ft. and under	105.00 to 106.00
Angles and splice bars	92.00 to 93.00
No. 1 cupola cast	87.00 to 88.00
Unstripped motor blocks	75.00 to 76.00

Cincinnati

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 52.00 to \$ 53.00
No. 2 hvy. melting	51.00 to 52.00
No. 1 dealer bundles	63.00 to 64.00
No. 2 bundles	25.00 to 26.00
Machine shop turnings	4.00 to 5.00
Shoveling turnings	6.00 to 7.00
Cast iron borings	17.00 to 18.00
Low phos. 18 in. and under	84.00 to 85.00
Rails, random length	65.00 to 66.00
Rails, 2 ft. and under	78.00 to 79.00
No. 1 cupola cast	58.00 to 59.00
Heavy breakable cast	25.00 to 26.00
Drop broken cast	75.00 to 76.00

New York

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 47.00 to \$ 48.00
No. 2 hvy. melting	38.00 to 39.00
No. 1 dealer bundles	23.00 to 24.00
Mixed borings and turnings	11.00 to 12.00
Machine shop turnings	6.00 to 7.00
Shoveling turnings	14.00 to 15.00
Clean cast. chem. borings	35.00 to 36.00
No. 1 machinery cast	89.00 to 90.00
Mixed yard cast	50.00 to 51.00
Heavy breakable cast	10.00 to 12.00
Stainless	
18-8 prepared solids	495.00 to 515.00
18-8 turnings	395.00 to 415.00
430 prepared solids	90.00 to 110.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 58.00 to \$ 60.00
No. 2 hvy. melting	48.00 to 50.00
No. 1 dealer bundles	58.00 to 60.00
No. 2 bundles	35.00 to 37.00
No. 1 busheling	65.00 to 67.00
Shredder scrap	65.00 to 67.00
Machine shop turnings	10.00 to 12.00
Shoveling turnings	18.00 to 20.00
No. 1 machinery cast	81.00 to 86.00
Mixed cupola cast	48.00 to 50.00
Heavy breakable cast	8.00 to 10.00

San Francisco

No. 1 hvy. melting	\$ 44.00 to \$ 46.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 dealer bundles	35.00 to 37.00
No. 2 dealer bundles	20.00 to 22.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	8.00 to 9.00
No. 1 cupola cast	81.00 to 83.00

Los Angeles

No. 1 hvy. melting	\$ 47.00 to \$ 49.00
No. 2 hvy. melting	40.00 to 42.00
No. 1 dealer bundles	38.00 to 40.00
No. 2 dealer bundles	20.00 to 22.00
Machine shop turnings	13.00 to 14.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	8.00 to 9.00
Elec. furnace, 1 ft. and under	74.00 to 76.00
(foundry)	75.00 to 77.00
No. 1 cupola cast	

Seattle

No. 1 hvy. melting	66.00 to 68.00
No. 2 hvy. melting	57.00 to 59.00
No. 2 bundles	40.00 to 42.00
No. 1 cupola cast	92.00 to 93.00
Mixed yard cast	82.00 to 84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 86.00
No. 2 hvy. melting, cut 2 ft. and under	78.00
No. 1 dealer bundles	84.00
No. 2 bundles	60.00
Mixed steel scrap	57.00
Bush new fact. prep'd	75.00
Bush new fact. unprep'd	31.00
Machine shop turnings	33.00
Short steel turnings	25.00
Mixed borings and turnings	85.00
Cast scrap	

Houston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 74.00 to \$ 75.00
No. 2 hvy. melting	61.00 to 62.00
No. 2 bundles	44.00 to 47.00
Machine shop turnings	14.00 to 15.00
Crushed turnings	31.00 to 33.00
Shredder scrap	78.00 to 79.00
Cut structural plate, 2 ft. and under	105.00 to 106.00
Cut structural plate, 5 ft. and under	89.00 to 90.00
Unstripped motor blocks	80.00 to 81.00
Cupola cast	82.00 to 83.00

STEEL PRICES

PRODUCER KEY With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio.
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Eliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Division, National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago, Ill.
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.
L5 Litho-Strip Corp., Chicago

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston

N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Nelsen Steel & Wire Co., Chicago, Ill.
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., North Tonawanda, N. Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Service, Buffalo, N. Y.

S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago, Ill.
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh, Pa.

W3 Weirton Steel Corp., Weirton, West Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh
W14 Whittaker Steel Strip Div., Detroit Mich.

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot Rolled 10 ga	Cold Rolled 20 ga	Galvanized 16 ga	Hot Rolled Strip	Plates	Standard Structural	Hot Rolled (merchant)	Cold Finished	Hot Rolled 8620 As Rolled	Hot Rolled 4140 Annealed	Cold Drawn 8620 As Rolled	Cold Drawn 4140 Annealed
Atlanta	26.95	31.73	34.11	31.63	25.27	22.55	19.84	31.25	34.34	50.60	69.58	73.19
Baltimore	26.90	30.72	35.71	36.82	32.66	28.80	22.60	36.40	51.69	56.95	63.60	69.98
Birmingham	25.58	31.73	34.35	31.26	25.40	22.42	20.28	31.30	49.31	58.90	68.10	74.43
Boston	34.94	40.19	45.64	47.54	33.25	30.06	23.88	40.29	47.92	51.02	58.48	63.50
Buffalo	31.10	35.68	41.89	40.15	30.60	26.15	20.15	36.70	44.15	47.85	53.92	59.84
Chicago	28.46	34.62	37.60	32.74	22.40	21.18	17.99	28.87	37.31	41.09	46.52	52.75
Cincinnati	29.60	34.58	37.16	30.85	23.14	20.75	18.25	31.88	37.16	42.54	46.63	52.44
Cleveland	28.48	34.22	37.48	36.74	23.60	23.58	18.89	34.02	38.19	44.50	47.48	53.93
Denver	31.44	38.19	36.22	37.09	27.40	24.56	20.39	39.80	50.55	57.95	65.95	70.19
Detroit	29.21	35.20	37.87	31.39	23.13	22.24	17.25	32.00	37.18	42.51	46.81	53.49
Houston	27.67	28.71	31.69	39.21	26.73	26.27	21.60	40.15	45.96	52.87	58.95	66.14
Kansas City	30.72	36.98	39.70	34.01	27.10	23.68	18.19	34.15	39.60	45.40	49.73	54.87
Los Angeles	27.01	31.33	37.84	34.31	28.39	32.31	26.81	38.05	50.88	57.10	63.15	70.64
Memphis	26.37	32.51	35.34	33.57	27.75	26.63	21.69	33.87	36.78	49.96	59.80	69.44
Milwaukee	28.76	34.19	36.99	33.06	23.79	23.54	17.87	29.01	36.58	41.65	45.66	52.60
New York	32.47	38.99	42.55	43.38	32.66	25.31	21.35	40.05	40.90	46.40	51.84	55.34
Philadelphia	28.10	38.99	41.23	43.50	31.05	27.15	19.28	36.44	45.80	50.25	60.22	65.42
Pittsburgh	35.27	40.97	45.23	43.45	37.60	30.44	21.58	30.44	38.43	44.64	49.90	54.10
Portland	28.96	32.08	38.73	36.93	32.88	34.78	27.16	44.85	49.78	57.74	70.44	.....
San Francisco	26.94	31.55	37.04	34.48	27.78	30.19	26.07	38.70	50.70	57.69	63.90	70.05
Seattle	23.61	30.12	36.65	32.95	22.02	27.32	26.05	39.14	53.03	61.70	69.75	74.63
Spokane	21.21	30.42	35.65	38.02	35.00	33.77	22.26	43.01	43.20	47.52	.....	58.32
St. Louis	29.11	34.60	37.31	34.59	23.89	21.73	18.44	32.28	38.12	43.51	47.85	53.69
St. Paul	28.87	33.61	35.61	38.36	23.81	22.48	17.99	32.18	37.52	42.72	47.09	53.31

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Cold sheet—16 ga x 36—120; Hot-rolled strip—1.8" x 1", Plate 1.4" x 84; Shapes—1 Beams 6 x 12.5; Hot-rolled bar—Rounds 3.4-2.15; 16; Cold finished bar—C 1018—1" rounds, Alloy bar—Hot-rolled 8620—1.5-8" round, Cold drawn—1" round; Hot-rolled 4140—1.5-8" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

STEEL PRICES

Codes identify Producers listed on p. 78. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A. = Not available

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest

W5 \$366.00

N4 \$366.00

West

C6 \$346.00

Carbon Forging, East

B3(2), C10, U1 \$473.00

R3 \$453.00

Midwest

R3, W5 \$453.00

S1, U1, I3 \$473.00

C10 \$473.00

K2 \$473.00

West

B3(2) \$463.00

C6 \$453.00

Alloy, East

R3 \$492.00

B3, U1, C10 \$512.00

Midwest

W5 \$492.00

U1, C10, I3 \$512.00

R3 \$492.00

S1 \$512.00

West

B3 \$502.00

C6 \$469.00

Piling Sheet Steel

(cents per lb)

Midwest

U1 \$26.45

Structurals

Carbon, East

B3 22.90

U1, J3 23.90

Midwest

C20 22.90

W8 22.90

I3, T10, U1, N4 23.90

West

C6 25.10

B3(2) 21.65

South

C16, U1 23.90

T10 22.90

A8 Cmp.

High-Strength, Low Alloy, East

B3 22.90

U1, J3 23.90

Midwest

N4 23.90

W8 24.15

U1 23.90

I3 23.90

West

B3 21.65

South

U1, C16 23.90

Wide Flange, Carbon, East

B3 22.90

U1, J3 23.90

Midwest

U1 23.90

N4 23.90

I3 23.90

West

C6 24.15

Strip

Hot-Rolled, Carbon, Cut II

Edge—all widths, East

U1, B3 23.75

J3 22.05

Midwest

D1 22.05

I4 22.85

J3, W3 22.05

G2, G3 23.45

N4 22.55

W5, S1, A7 23.75

U1, B3, I3 23.75

M2, R3 22.05

West

B3 26.55

South

R3 22.05

Cold-Rolled, Carbon Max. 25%, East

E4 29.75

S10 29.60

P15 24.80

B4 36.60

G6 36.175

Midwest

I4 38.30

W14 32.80

J4 34.05

S1 37.05

High-Strength, Hot-Rolled, Low Alloy, Cut

Edge & Mill Edge—all widths, (plus extras)*

Midwest

M2, R3, W3, J3, I3 22.05

G2, G3 23.45

S1 23.75

A7 25.35

South

R3 22.05

High-Strength, Cold-Rolled, Low Alloy, Mill

Edge

Midwest

S1 37.05

Alloy, Hot-Rolled, Midwest (plus extras)*

S1 26.10

I4 25.20

Alloy, Cold-Rolled, East (plus extras)*

E4, M8 43.35

B4 47.25

P15 32.10

Midwest

T4 44.30

S1 44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Heavy)

East

B3 23.75

J3 22.05

U1 23.75

Midwest

M2, R3, W3 22.05

D1, J3 22.05

G2, G3 23.45

I4 22.45

U1, W5, S1, B3, I3, A7 23.75

West

U1 24.25

South

R3 22.05

Cold-Rolled, East, Class I

B3(2) 28.15

J3 26.15

U1 28.15

Midwest

R3, M2, W3 26.15

G2, G3, M11 27.85

I4 22.00

J3 26.15

D1 26.15

U1, W5, S1, B3, I3, A7 28.15

West

U1 28.65

South

R3 24.65

Galvanized (hot-dipped), East

B3(2) 30.30

U1 30.30

Midwest

J3, D1, W3 28.00

R3, Y1 28.00

G2, M11 30.00

U1, W5, S1, I3, A7 30.30

West

U1 30.80

South

R3 28.00

Enameling, Midwest

U1, S1, I3, A7 29.65

J3 27.65

Long-Term, Midwest

W5, A7 31.65

U1 31.65

R3 29.35

Wire Rod

East

B3(2) 22.35

Midwest

N4, K2 22.35

U1 24.10

A7 22.00

West

C6 21.45

South

G7 22.35

Tinplate

Electrolytic Tinplate

Single Reduced (70 lb)

East

J3 26.29

U1 27.74

B3 27.54

Midwest

U1 27.74

J3 26.29

M11 27.24

W3 26.29

W5 27.74

West

U1 28.24

South

U1 27.74

Double Reduced (55 lb)**

Midwest

M11 21.87

J3 21.49

U1 22.37

W3 21.49

W5 22.37

West

U1 22.87

South

U1 22.37

Black Plate

Single Reduced (75 lb)*

East

B3 24.31

Midwest

J3 24.01

I3, W5 24.57

W3 24.01

U1, M11 25.26

West

U1 25.26

Double Reduced (55 lb)

East

B3 20.49

Midwest

M11 19.70

W5 19.70

J3 18.93

W3 18.93

U1 19.70

West

U1 19.70

South

U1 19.70

*70 lb—base weight extra 45¢

**50 lb—base weight extra 1.40

Bars

Carbon Steel, Hot-Rolled

(Special quality)

East

R3, K3 25.80

R5 25.80

J3 25.80

U1, C10, B3(3) 27.05

Midwest

I4 23.95

U1, I3 27.05

R3, T10, C20, N4 25.80

K2 25.80

I3 22.00

A7 20.25

West

B3 25.80

C6 24.45

South

A8 20.65

C16 25.80

Cold-Finished Carbon, East

A11 22.15

R3 33.75

T11, S8 31.00

J3(4), L2 31.00

M8, W10 31.00

N1 24.475

R4 33.25

B4 33.25

C10 31.00

Midwest

W10, R3, M9 33.25

J3 31.00

ORDERS ENDED THE YEAR ON THE DECLINE

New orders for manufactured goods hit the skids again in December. Orders had rebounded in November following three previous months of declines.

Analysts attribute much of the decline to a drop in military orders following an exceptionally large increase—100 pct—in November.

For all of 1984 new orders were up a healthy 10.5 pct, peaking at close to \$2.3 trillion. The 1984 increase reflects the overall strength of the economy during 1984.

In addition, durable goods industries' shipments in December were up 4.7 pct led by electrical machinery and transportation equipment. However, shipments of primary metals and nonelectrical machinery were down in December.

Overall new orders for manufactured goods dropped 0.7 pct in December compared with November to \$193.5 billion, the Commerce Department said. The figures indicate that while consumers are willing to spend, business investment plans are still somewhat uncertain. One of the results of that was durable goods industries' inventories rose slightly—0.4 pct—marking 11 months out of the twelve that they were up.

December new orders for durable goods dropped 2.9 pct to \$101.0 billion compared with \$104.0 billion in November.

For the year, gains and declines balanced at six months each.

Capital goods orders in both non-defense and defense industries dropped in December. The former category—a key indicator of business investment plans—was down 6.3 pct to \$25.5 billion.

Of the 24 categories shown, 11 were down, eight were up and 5 were unchanged. In the two shipments categories, motor vehicles and parts and farm machinery and equipment were unchanged.

Billions of Dollars, Seasonally adjusted
Monthly Total, unless otherwise noted
Source: U.S. Dept of Commerce

	Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)			
U.S. Industry, Total	4th Qtr. \$321.4*	\$316.2	\$321.6
Manufacturing, Total	4th Qtr. 139.1*	135.5	114.9
Manufacturing, Durable Goods	4th Qtr. 67.5*	64.8	53.5
Mining Industry	4th Qtr. 12.9*	13.2	13.1
KEY INDICATORS, Durable Goods Manufacturing			
New Orders	Dec. 101.0	104.0	96.7
Shipments	Dec. 101.8	101.7	96.0
Inventories	Dec. 191.2	190.4	171.2
Unfilled Orders	Dec. 345.9	346.7	322.2
NEW ORDERS, METALWORKING			
Capital Goods Producers, Nondefense Industries	Dec. 25.5	27.1	25.1
Capital Goods Producers, Defense Industries	Dec. 8.6	10.3	7.7
Primary Metals, Total	Dec. 10.3	10.8	10.3
Steel (SIC 331)	Dec. 4.7	4.7	3.7
Iron & Steel Castings (SIC 332)	Dec. 1.1	1.1	1.2
Nonferrous Metals	Dec. 4.5	5.0	5.4
Nonelectrical Mach.-Equip. Industries, Total	Dec. 16.1	18.1	16.8
Engines & Turbines	Dec. 1.6	1.3	1.2
Farm Machinery & Equipment (Shipments)	Dec. 0.8	0.8	1.2
Construction, Mining & Mat. Hdlg. Equip	Dec. 2.7	2.7	2.8
General Industrial Machinery	Dec. 1.2	1.5	1.4
Fluid Power Equipment** (Index-1972=100)	Dec. 231	269	248
Metalworking Machinery	Dec. 1.3	0.9	0.5
Machine Tools, Total (\$Mill., Unadjusted)***	Dec. 252.2	212.0	151.1
Machine Tools, Metalcutting***	Dec. 156.2	160.0	91.1
Machine Tools, Metalforming***	Dec. 96.0	52.0	60.0
Electrical Mach. & Equip. Industries, Total	Dec. 15.4	14.5	16.0
Elec. Transmission Equip. & Ind. Apparatus	Dec. 2.2	2.0	2.0
Household Appliances	Dec. 1.4	1.4	1.5
Communication Equipment	Dec. 5.7	5.0	5.5
Transportation Equip. Industrial, Total	Dec. 26.6	28.6	24.3
Motor Vehicles & Parts (Shipments)	Dec. 16.9	16.7	15.2
Aircraft, Missiles & Parts	Dec. 8.3	10.2	7.6
Shipbuilding & Military Tanks	Dec. 0.6	1.2	0.2
Fabricated Metal Products, Total	Dec. 12.9	12.4	10.7
Instruments, Total	Dec. 4.8	4.8	4.6

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTA.

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IRON AGE

MANUFACTURING MANAGEMENT

STEP DRILL A-17

DRILL A-15.15

DRILL A-27.40

41

PROBE

DRILL A-2.37

BURR DR A-28

DRILL A-2.36

REAM A-37

BURR DR A-54

REAM A-36

BURR DR A-52

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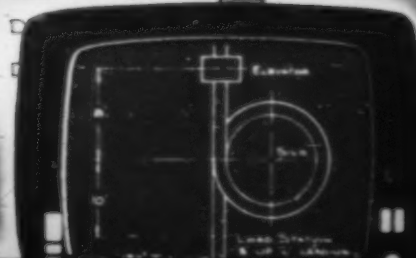
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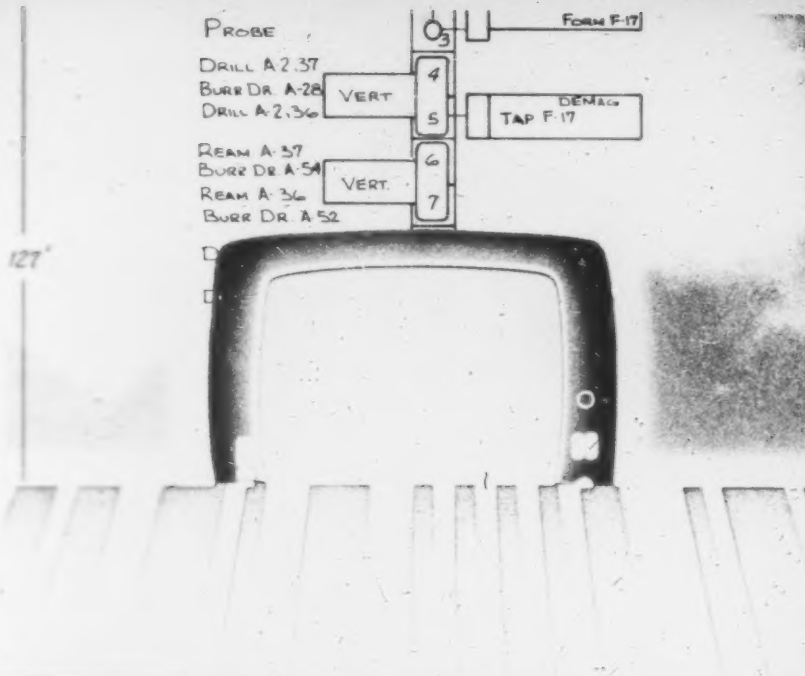


COMPUTERS IN MANUFACTURING: OFF THE DRAWING BOARD AND INTO THE FACTORY PLUS A GUIDE TO NEW PRODUCTS IN THE MARKETPLACE

NEW TECHNOLOGY SPURS A CASTINGS AND FORGINGS REVIVAL IN DETROIT
TREASURY TAX PLAN: IGNORING THE FUTURE AT OUR OWN PERIL?
4TH QUARTER EARNINGS: BIG STEEL STILL BATTERED;
NONFERROUS DEALT A SETBACK
TORQUE TIGHTENING: A COMPETITIVE EDGE IN FASTENING SYSTEMS

IRON AGE

MANUFACTURING MANAGEMENT



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ONE OF THE ABC PUBLISHING COMPANIES

FALLING ENERGY PRICES KEEP A LID ON INFLATION

January producer prices showed no change from December despite jumps within several individual categories of the index, the U.S. Commerce Department said. The index has stayed the same or declined in seven of the past 12 months.

Declining energy prices offset increases in other categories by dropping 2.4 pct in December, the biggest monthly decline since March 1983 when they fell 3 pct.

Nevertheless, government price watchers see another ominous trend in the latest price report—an unusually fast acceleration (0.6 pct) in all categories except food and energy. Until January this part of the index rose no more than 0.3 pct in any month since last March.

Commerce analysts said January is a month in which companies that raise prices only once a year choose to do so and this month they raised them higher than usual. This, the Commerce Department said, could account for the sharp 1.7 pct jump in prices for both autos and light motor trucks. Prices for both will rise again, but not in the foreseeable future, the government said.

Raw material prices dropped 2.2 pct in January, the sharpest decline since April 1980 and a sign that there is little upward pressure on prices for the next several months.

Moderate economic growth, industry expansions, firm monetary policy and the strong dollar are the factors keeping inflation in check. The strong dollar has been making foreign goods cheaper for American consumers and forcing U.S. producers to keep their prices in line.

And just as auto prices went up, so did auto production, according to the Federal Reserve. U.S. factory production rose 0.4 pct, a modest hike. The resumption of full production in auto plants took the annual production rate up more than 6 pct.

Latest Month Covered: January 1985

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	389.4	— 1.3	+ 2.9
Metal Forming Machine Tools	430.0	+ 0.3	+ 2.6
Agricultural Machinery & Equip.	338.5	+ 0.3	+ 2.3
Construction Machinery & Equip.	360.4	+ 0.6	+ 1.8
Industrial Process Furnace & Ovens	381.7	+ 0.2	+ 3.1
Industrial Material Handling Equip.	292.4	+ 0.1	+ 1.9
Pumps, Compressors & Allied Equip.	353.2	+ 0.3	+ 1.9
Fluid Power Equip. (Dec. 1970 = 100)	261.9	0	+ 2.7
Mechanical Power Transmission Equip.	335.3	+ 1.4	+ 4.2
Automobiles	227.2	+ 1.7	+ 2.4
Motor Trucks—Light	294.4	+ 1.7	+ 5.0
Motor Trucks—Heavy	331.2	0	+ 2.0
Railroad Equipment	358.9	0	+ 2.1
Fabricated Metal Structural Products	312.8	— 0.1	+ 2.1
Electric Motors	348.9	+ 2.0	+ 3.5
Valves & Fittings (Dec. 1982 = 100)	103.6	+ 0.8	+ 3.3
Ball & Roller Bearings	345.8	+ 0.4	+ 2.9
Cutting Tools & Accessories	285.0	+ 0.6	+ 3.0
Heating Equipment	256.6	+ 0.1	+ 3.8
Plumbing Fixtures & Brass Fittings	306.4	+ 1.2	+ 4.3
Metal Containers	357.6	0	+ 3.9
Miscellaneous Metal Products	301.8	+ 0.1	+ 4.0

Data based on U.S. Labor Dept.'s Producer Price Index

4th QUARTER EARNINGS

STEEL BATTERED; NONFERROUS DEALT SETBACK

BY GEORGE MCMANUS & ROBERT REGAN

The domestic steel industry as a whole lost money for the third straight year, while nonferrous metals producers found it difficult to squeeze out much in the way of profits.

Steel

Help is on the way, and it will hopefully arrive in time for the ailing steel industry.

After a disastrous 1984, demand for steel has risen about 30 pct. If the improvement continues, it should ward off the drastic attrition that now threatens.

"I look for a fairly strong operating environment to surface by mid-year," said Robert A. Hageman, vice president, Kidder Peabody & Co. Mr. Hageman pointed out that very minor increases in steel volume and prices can have enormous impact on profits.

There's no question the steel industry has the potential for a dramatic turn-around. Obscured by the terrible conditions of recent times has been a massive cost reduction. Given a halfway decent market, the cost cuts will translate into spectacular profits.

It's also true, however, that there is the potential for terminal trouble. In 1984, the steel industry as a whole lost money for the third straight year. As the year advanced, things got worse instead of better.

The bleeding can't continue much longer without major casualties. "None of the options are good," said John C. Tumazos, analyst for Oppenheimer & Co.

Mr. Tumazos said bankruptcy was one of the options. Once mentioned only in hushed tones, steel failures were openly and widely dis-

cussed in early 1985.

Wheeling-Pittsburgh Steel Corp. can't survive without a restructuring of its debt, warned Paul Rusen, director of the Wheeling district of United Steelworkers of America.

Mr. Tumazos said steel operating losses were as high as \$47 a ton in the fourth quarter of 1984. He said hard pressed steel companies may have to sell off prize assets. "What all these companies need is an infusion of equity."

Mr. Hageman agreed things were tough. "There's no question the balance sheets of all the companies are bad," he said, noting that short term debts exceed cash. He was optimistic that the Reagan Administration's import curbs would ease the crisis.

"I think there will be some improvement this year," he said. He expected the steel industry to follow the same scenario that saw auto profits zoom after car imports were restricted.

The peril and the promise of the steel industry were brought out by Mr. Tumazos' estimates of losses on actual steel operations. Leaving out taxes and special accounting adjustments, he calculated that United States Steel Corp. lost \$33 a ton in the fourth quarter of 1984. That wasn't too good, but it compared with a U.S. Steel loss of \$241 a ton in the fourth quarter of 1982.

The reduced loss suggested that there had, indeed, been a deep cost cut. The losses of other major mills

show comparable declines.

While the whole steel industry took a beating last year, there were striking differences between mills. The big success story was Weirton Steel Corp. The \$60.6 million profit of Weirton came to a very respectable 5.6 pct of sales. Weirton's experiment in employee ownership got off to a rousing start.

"The sacrifices of our employees and a fine team effort in cost control helped us to operate in the black," said Robert L. Loughhead, president of Weirton.

At the other end of the spectrum was the \$378 million loss of LTV Corp. in 1984. LTV's steel business had an operating loss of \$152 million. That included a charge of \$74 million from facility rationalization and staff reductions.

LTV has lightened its capital burden by joining with Sumitomo Metal Industries, Ltd., in a big electro-galvanizing project. Wheeling-Pittsburgh has teamed up with Nisshin Steel Company, Ltd. in a galvanizing line. Nippon Kokan has acquired a half interest in National Steel Corp.

There could be other deals of this type as domestic mills seek added equity. The problem is that the least saleable assets are the ones companies would like to shed. LTV could find a ready market for its profitable defense business, but the company's Gadsden plant hasn't been snapped up by outside interests.

STEEL: BIG REDS AND LITTLE BLACKS

1984 PROFIT REPORT (In Millions of Dollars)

	EARNINGS				SALES		
	1984 E/S	1984	1983	Pct Change	1984	1983	Pct Change
USS	2.6	493.0	(\$1,161.0)	--	\$19,104.0	\$17,539.0	+9
LTV	--	(378.2)	(180.7)	--	7,046.1	4,577.8	+54
BETHLEHEM	--	(112.5)	(163.5)	--	5,392.1	4,898.2	+2
ARMCO	--	(295.0)	(672.5)	--	4,543.1	4,164.6	+9
INLAND	--	(41.4)	(116.9)	--	3,324.8	2,929.4	+14
NATIONAL	2.3	52.6	(154.3)	--	2,294.3	2,922.7	-22
TOTAL	--	(281.5)	(2,448.9)	--	41,664.4	37,031.7	+13
CYCLOPS	1.4	18.4	(2.2)	--	1,271.6	1,024.1	+24
WEIRTON	5.6	60.6	--	--	1,073.1	929.0	+16
INTERLAKE	4.3	36.6	22.8	+60	845.1	763.6	+11
NUCOR	6.7	44.5	27.9	+60	660.3	542.5	+22
COPPERWELD	1.0	4.5	(24.3)	--	442.2	325.5	+36
LUKENS	1.1	4.7	(14.0)	--	416.4	342.9	+21
QUANEX	0.5	2.0	(3.5)	--	398.3	297.4	+34
CF&I	--	(28.2)	(94.2)	--	325.3	231.1	+41
FLORIDA*	2.3	6.7	(4.7)	--	286.1	235.1	+22
EASTMET	--	(13.8)	(8.2)	--	238.9	192.2	+24
LACLEDE	3.2	7.5	2.8	+165	231.6	190.2	+22
CARPENTER**	5.9	8.1	6.6	+22	137.8	116.6	+18
PHOENIX	--	(6.4)	(32.1)	--	124.9	112.0	+12

*Quarter only **Year ending Sept. 30

STEEL 4TH QUARTER PROFIT REPORT—1984 (In Millions of Dollars)

	EARNINGS				SALES		
	1984 E/S	1984	1983	Pct Change	1984	1983	Pct Change
USS	0.6	29.0	(983.0)	--	4,659.0	4,712.0	-1
LTV	--	(246.7)	7.5	--	2,008.9	1,511.5	+33
BETHLEHEM	--	(64.5)	(27.4)	--	1,188.7	1,322.5	-10
ARMCO	--	(64.5)	(46.8)	--	1,118.6	1,067.2	+5
INLAND	--	(28.3)	(45.9)	--	776.0	831.9	-7
NATIONAL	7.2	12.8	(38.0)	--	177.0	784.3	-77
TOTAL	--	(387.8)	(1,133.6)	--	9,927.8	10,229.5	-3

NONFERROUS: A MIXED BAG

4TH QUARTER PROFIT REPORT—1984 (In Millions of Dollars)

	NET INCOME			SALES AND OTHER REVENUES		
	1984	1983	Pct Change	1984	1983	Pct Change
ALCAN	\$20.0	\$55.0	-63.6	\$1,319.0	\$1,408.0	-6.3
ALCOA	(14.7)	96.3	--	1,386.0	1,469.7	-5.7
ASARCO	(236.3)	11.7	--	282.2	392.5	-20.5
BRUSH WELLMAN	9.8	7.9	+24.1	79.2	65.7	+20.5
CABOT	24.5	17.5	+40.0	559.3	399.9	+39.9
COMINCO	(5.1)	1.1	--	376.5	394.1	-4.5
ECHO BAY	6.8	3.8	+78.9	24.6	15.9	+54.7
FALCONBRIDGE	9.0	10.5	-14.3	204.4	176.9	+15.5
HECLA MINING	(3.4)	5.4	--	22.2	36.1	-38.5
INCO	4.5	(54.6)	--	388.8	348.0	+11.7
KAISER ALUMINUM	(27.8)	42.0	--	897.2	775.8	+15.6
MARTIN MARIETTA	33.3	37.4	-11.0	1,118.2	914.0	+22.3
NEWMONT MINING	5.6	1.5	+273.3	194.1	195.6	-0.8
OLIN	12.2	12.2	--	496.0	484.9	+2.3
PINE POINT MINES	3.7	1.2	--	29.6	24.8	+19.4
REVERE COPPER	8.6	12.7	-32.3	143.1	146.4	-2.3
REYNOLDS METALS	38.4	12.3	+212.2	839.6	846.6	-0.8
VULCAN MATERIALS	17.4	18.1	-3.9	254.5	232.2	+9.6

Alcan Aluminum Ltd: Net includes \$8 million in '84 period and \$15 million in '83 period extraordinary gains from tax-loss carryforwards. **Aluminum Co. of America:** Loss for '84 quarter includes write-downs of \$41 million on Mobile, Ala. alumina refinery, \$7.5 million on write-off of an equity investment in Grenoble, France, and \$5 million write-off of construction costs for a potline at Badin, N.C. smelter which will not be completed. There also was an \$11.8 million charge for re-evaluation of tax liabilities for the year, a foreign exchange currency loss of \$4.4 million and a \$20.5 million gain on the sale of company's share in a partially completed power generating complex in Texas. **Ames Inc.:** Results for the '84 quarter include \$205 million loss provision on properties and investments and a \$5.4 million loss on sale of oil and gas properties. Loss for the '83 period includes a \$308.8 million loss provision on properties and investments. The '84 period also includes a \$9 million reversal of tax benefit from a tax-loss carry-forward. **Asarco:** Loss for '84 period includes pre-tax charges of \$216 million from closing of certain facilities and write-down of assets. Net for '83 period includes pre-tax gain of \$20.4 million from sale of tax benefits and a mineral prospect. Results for both periods exclude preferred stock dividend require-

ments. **Brush Wellman Inc.:** Net for the '83 period includes a \$68,000 loss from discontinued operations. **Cominco:** Canadian funds. **Falconbridge Ltd.:** Canadian funds. **Hecla Mining Co.:** Net loss for '84 period includes \$879,000 debit for reversal of tax-loss carry-forward. Net for '83 period includes extraordinary credit of \$389,000. **Inco:** Net for both periods excludes preferred stock dividend requirements. **Kaiser Aluminum & Chemical Corp.:** Sales for '83 period are restated to reflect discontinued operations. Net income for '83 includes \$9 million loss on discontinued operations. **Martin Marietta Corp.:** Sales for '83 period are restated to reflect discontinued operations. Net income for '83 period includes \$5.6 million income from discontinued operations. **Pine Point Mines Ltd.:** Canadian funds. **Phelps Dodge Corp.:** Results for '84 period includes \$195 million pretax charge relating to the restructuring of certain operations, of which \$85 million reflects disposal of Western Nuclear, Inc. and other energy operations. **Revere Copper & Brass, Inc.:** Net for the '83 period includes \$615,000 tax benefit from tax-loss carry forward. **Reynolds Metals Co.:** Net for '84 period includes \$6.3 million extraordinary gain from tax-loss carry forward. Net for '83 includes \$9 million charge on a plant closing.

U.S. Steel had profits of \$29 million in the fourth quarter and \$493 million for the year. An operating profit of \$142 million was reported for the steel segment. That came to \$12 a ton, which compared with a loss of \$55 a ton in 1983.

The troubles of Bethlehem Steel Corp. continued in 1984. Bethlehem lost \$64 million in the fourth quarter and \$112 million for the year. The company's steel sector had an operating loss of \$67 million in the fourth quarter.

Bethlehem wasn't counting on an early end to its difficulties. "There is a substantial overhang of inventories because of the flood of imports," said Donald H. Trautlein, chairman. "And steel prices are very depressed. We, therefore, expect to incur a significant loss in the first quarter."

The rest of the year will hinge on the effectiveness of the government's import program, said Mr. Trautlein.

National Steel had net profits of \$1.9 million in the fourth quarter and \$20.8 million for all of 1984. Contributing to profits was the liquidation of \$39.5 million in inventory.

Most of the major mills were converting inventory to cash in 1984. This emptying of pipelines could result in an abrupt tightening of supply in 1985.

Going from deficits in 1983 to profits in 1984 were Cyclops Corp.; Lukens, Inc.; Qualex Corp.; Florida Steel Corp.; and Copperweld Corp.

Carpenter Technology Corp. continues in its own separate, profitable world. Carpenter earned 5.9 pct on sales in the most recent quarter reported.

Nonferrous

Producers of base nonferrous metals found it difficult to squeeze much in the way of profits out of so-so business levels in the fourth quarter of 1984. Imports siphoned off most of the cream from the domestic copper and aluminum markets and the main legacy of the business recovery of 1984 was a sharp draw-down of hedge market inventories of copper, aluminum and nickel.

North American aluminum producers were battling with rising inventories of aluminum ingot through the second half of the year and a series of production cuts (extending through the current quarter) didn't bring much improvement in free market ingot prices. Aggregate aluminum shipments of Aluminum Co. of America; Alcan Aluminium, Ltd.; Reynolds Metals Co., and Kaiser Aluminum & Chemical Corp. were off 4.1 pct in the fourth quarter at 1.5 million short tons.

Reynolds Metals scored a sizable gain in fourth quarter net that reflected mainly a better product mix. Alcoa's poorer product mix reportedly reflected clearance sales of ingot, production of which Alcoa has cut back further in the current period. Alcan's ingot and mill product shipments both were down and the company said prices for both categories fell during the fourth quarter, particularly in the North American market. Imports of ingot and mill products were sharply higher in 1984.

Alcoa Chairman Charles W. Parry said pressure on mill product prices will continue through the first half of 1985, "reflecting low ingot and scrap prices and a high level of imports into the U.S."

Mr. Parry said Alcoa's capital budget for 1985 is \$668 million. The company spent \$594 million for capital improvements last year, about \$6 million less than was budgeted. Most of the emphasis is being directed toward quality and capacity expansion in the rolling sector, which is expected to get more competitive in the future.

Alcoa's fourth quarter results also were impacted by writedowns of facilities and the cancellation of work on a planned expansion of a smelter in North Carolina.

Kaiser Aluminum credited its fourth quarter loss to lower aluminum prices and restrictions on mill product capability from modernization work at its big Trentwood, Wash., mill.

Revere Copper & Brass, Inc., said its primary aluminum operations were in the red because of low prices

but aluminum results overall were helped by improved earnings of the Wells extrusion group and a substantial turnaround by the aluminum sheet mill at Scottsboro, Ala., which is being sold to Noranda Aluminum Co. Revere's fabricated copper and brass segment experienced lower sales prices and volume in the fourth quarter.

Asarco, Inc., took a \$236.1 million fourth quarter loss, including a \$216 million charge for indefinite suspension or permanent closing of certain mine and plant facilities and the writedown of certain assets. Operating results were adversely affected by weak prices for copper, silver, lead and zinc. These contributed to a fourth quarter loss before the writedowns of \$20.3 million. Asarco had net income of \$11.7 million in the fourth quarter last year.

Phelps Dodge Corp. scheduled a \$195 million charge against fourth quarter results to restructure certain operations.

Inco, Ltd., managed a \$4.5 million profit for the fourth quarter of 1984, breaking a chain of 13 quarters in the red. Inco said the gain reflected mainly substantially lower production costs and its average realized price for primary nickel, including intermediates, was \$2.29 a lb., the same as it was in the final period of 1983, when the company sustained a \$54.6 million loss. Inco carried 88 million lbs of finished nickel inventory into 1985, about 5 million lbs more than it had in stock a year earlier. The nickel inventory on the London Metal Exchange dropped sharply last year and this, together with political difficulties in New Caledonia, have strengthened hedge market prices since the turn of the year.

Inco's nickel shipments moved up to 356 million lbs last year from 314 million lbs in 1983 and production moved up to 359 million lbs from 283 million lbs in 1983.

Falconbridge, Ltd.'s, net was down for the fourth quarter but results for the year were substantially better with an \$80.2 million profit compared with a \$16.6 million (Canadian funds) loss in 1983.

OFF THE DRAWING BOARD AND INTO THE FACTORY

COMPUTERS IN MANUFACTURING

Tough competition is forcing firms toward computer-integrated manufacturing. Yet the CIM marketplace abounds with new products and vendors. Distinguishing the major players is a problem.

By Robert Harvey

In years past, computer-integrated manufacturing (CIM) was considered "Star Wars" technology—thought-provoking though impractical. Today, however, CIM is no longer science fiction.

The sudden importance of CIM is underscored by the rush of players into the CIM arena. Software, hardware, and systems vendors are hurriedly hammering out or polishing up their CIM strategies.

Just a few weeks ago, for example, Honeywell, Inc., a major computer manufacturer, announced its integrated information and control systems architecture for manufacturing automation. The architecture addresses a wide range of process, batch, and discrete parts manufacturing operations. Honeywell, which has been a major supplier of process technology, will use this process expertise to establish a CIM beachhead in the discrete parts manufacturing marketplace.

Also recently, Digital Equipment Corp., Maynard, Mass., arguably the largest supplier of computer equipment for factory floor systems, opened a research and development center, called CIMLAB 1, for building and testing computer-integrated manufacturing systems. The facility

will help Digital customers develop their own particular CIM strategies.

The developments at Honeywell and Digital are representative of the intensive efforts in recent months by a great number of hardware, software and systems developers to prominently position themselves in the CIM marketplace, a market beginning to show signs of awakening. Increasing worldwide competition is forcing manufacturers to view CIM no longer as a luxury.

For the executive, however, who is considering installing these CIM products, this kaleidoscope of vendors, technologies, and strategies can be overwhelming. At one end of the spectrum are the people attacking CIM on a broad front, at the other end reside niche players.

Examples of firms using the broad brush approach include computer makers like Honeywell, IBM, Hewlett-Packard, Digital, Gould, and Data General; systems and component suppliers like Schlumberger, General Electric and Westinghouse; as well as some machine tool and material handling firms, software vendors and system engineers.

As mentioned earlier, Honeywell has positioned itself to supply CIM expertise to a wide variety of companies involved in process, batch, or discrete manufacturing.

"Let me describe our view of manufacturing automation," explained William W. George, executive vice president, control systems, at Honeywell. "To us it comprises the total spectrum of industrial production, from the extraction of raw materials through the handling of finished goods."

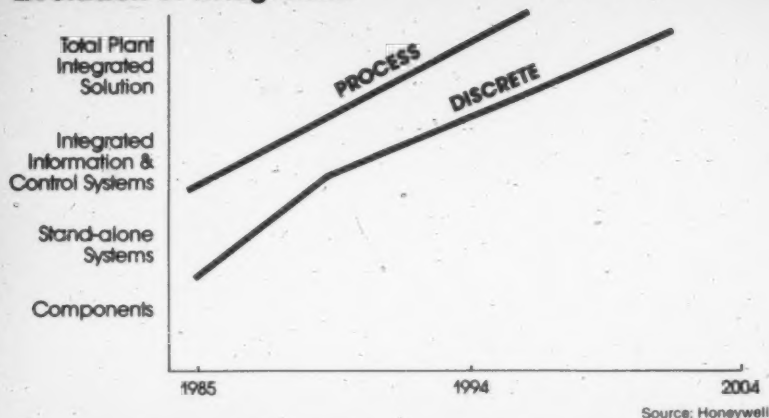
Over the past 20 years, the process industries, such as oil refining, chemicals, and pulp and paper, have developed very sophisticated control systems for running their continuous and batch processes.

"Their automation systems include advanced control features such as closed-loop control, full redundancy, operator verification, distributed control and process optimization," said Mr. George. "At the same time, the discrete industries



A manufacturing engineer reviews a blueprint design while the part is assembled in the adjacent area at Digital's CIMLAB in Shrewsbury, Mass.

Evolution of Integration



Integration has been slow catching on in discrete parts manufacturing. However, during the next two decades, integration efforts will pick up considerably.

U.S. Manufacturing Automation Market

(In Billions of Dollars)	1985	1990	1995	Growth Rate
Manufacturing Planning & Control/Communications	\$3.8	\$8.4	\$14.5	15%
Process Control	3.1	5.5	10.0	12
Programmable Controllers	.6	1.4	3.0	18
Sensors/Actuators	2.4	4.7	9.3	15
CAD	\$1.7	\$4.5	\$12.0	22%
Robotics	.4	2.1	4.5	27
Machine Tools	5.3	9.7	18.0	13
Automated Inspection & Test	3.0	7.2	12.0	15
Automated Material Handling	5.0	8.9	15.0	12
Total	\$25.3	\$52.4	\$98.3	15%

Source: Honeywell

such as automotive, appliances, machinery and consumer electronics, have been concentrating on improving the efficiency of the work place, individual machine operations and the movement of materials.

"Until recently, automation in discrete manufacturing focused on the sub-sets of an activity required to make a product. But now it is becoming clear that highly automated discrete manufacturing will look much more like a continuous process. Thus, many of the control technologies now used in continuous processes will be found in the factories of the future."

Communication Needs

Besides addressing a range of industries, Honeywell is tackling the automation and communication needs within particular factories.

"A manufacturer needs a system in which all components can communicate so that information from a sensor on a factory floor can move up to the department manager, the plant manager, and ultimately the top executives. This systems integration effort is one that manufacturers usually choose not to do themselves and can't risk leaving to an outside software house," said Mr. George. "What many manufacturers are looking for today is support in developing their manufacturing automation plan."

To strengthen its position in discrete parts automation, Honeywell last year invested in Industrial Solid State Controls (ISSC), a maker of programmable controllers and communications products, and acquired Digital Datacom, Inc., a maker of

factory-floor microcomputers and supervisory workstations.

More recently, Honeywell announced its integrated information and control architecture for process to discrete manufacturing operations and will support the manufacturing automation protocols (MAP) being proposed by GM.

Honeywell has also introduced a new Supervisory Work Center, the WCC 1250, which provides data processing and reporting on quality control, work-in-process status, maintenance scheduling and testing.

Another firm approaching CIM with a broad brush is Schlumberger. The company has acquired a matrix of companies, giving Schlumberger the ability to address a variety of automation needs.

When Schlumberger looked at

manufacturing, it saw three major kinds of products being made: computer chips, printed circuit boards which housed the chip, and larger products, the automobiles, the airplanes, the machines, which increasingly contained chips and boards.

To address these three manufacturing segments Schlumberger formed Computer-Aided Systems (CAS) to provide computer-aided design (CAD), computer-aided engineering (CAE), computer-integrated manufacturing (CIM), computer-aided manufacturing (CAM), and computer-aided testing (CAT) support.

"There are five companies or units now in CAS," explained Daniel J. Sliski, director of marketing services, Applicon. "They include Applicon, Benson, MDSI, Factron, and Sentry, and look what you have got: a CAD company (Applicon), a plotter vendor (Benson), an NC company (MDSI), a subassembly test company (Sentry) and a component test company (Factron). For CAD and CAE, primarily we look to Applicon and Benson. Manufacturing Data Systems Inc. (MDSI) along with Applicon are charged with addressing CIM and CAM. The other two firms handle CAT."

Unbroken Chain

Although each unit in CAS retains its own identity, Schlumberger primarily is looking for an unbroken chain of technology from concept to finished product over three broad areas of manufacturing.

As the leading player within this environment Applicon sees itself playing an increasingly larger role in industrial automation efforts.

The key to tomorrow's automation efforts is integration. A major part of integration efforts today involve getting a wide variety of dissimilar hardware, computers, machine tools, CAD systems, whatever, to talk to each other.

"Nevertheless, I think that this hardware integration is the easiest task we have," said Mr. Sliski. "Getting equipment to talk together is not the big challenge, the bigger challenge is integrating software."

"If you look at a piece of software, it is usually there so it can do a particular application. (Will it do the

job?) The other element in the piece of software is the user interface. (How to I get it to do this job?) You also have to have a data storage and retrieval mechanism. (What does it do with the data?)"

All is well with this arrangement until multiple applications are run, then problems develop. New application software usually comes with a unique user interface and also a unique way of storing and retrieving data.

"Applicon didn't like this approach, so we came up with a common user interface and a consistent way for you store and retrieve data and a data base management system to keep watch over that data."

With its BRAVO software system providing software compatibility to go along with the hardware compatibility that is being developed, Applicon sees itself in a good position to address CIM needs.

Another company that has recently re-dedicated itself to solving the problems of CIM is Digital Equipment Corp. Digital's major effort is to address the problems developing in large companies as they try to integrate across a great diversity of equipment and operations.

"We define CIM as the ability to integrate the entire manufacturing enterprise which may include a number of different companies working together," explained Jack Conaway, Digital's CIM marketing manager. "In the auto industry, for instance, GM has a number of suppliers, dealers, ad agencies and the like and somehow the whole enterprise has to work together. What these large companies are asking us for is to make some real progress against corporate goals that they are trying to satisfy, goals like time-to-market, quality of product, customer satisfaction, asset management, and flexible product mix."

No Direction

However, companies continue to buy automation for automation sake without regard for overall direction or general corporate goals.

"A good example of that is what is going on in the CAD/CAM world," observed Mr. Conaway. "Most vendors approach the prob-

lem as a task automation problem. They are not really concerned with what happens to the data after it gets out of their realm of influence. A company may achieve four-to-one productivity increases in computer-aided design, but if they are now shipping three times as much paper over to their manufacturing engineering people, they may not be getting any progress against their time-to-market goal."

Digital's CIM strategies include supplying data management tools that include getting heterogeneous systems to talk to each other.

"Our strategy is to use common data interfaces and standards which allow the customers to select various types of task automation from different vendors," said Mr. Conaway. "One thing we are doing is building a CIM architecture that includes a number of standards able to interface different types of applications."

Digital's offerings will not be application software but the integration software that ties everything together. One, BASEWAY manufacturing software, allows firms to monitor and control automation devices like programmable controllers and bar code readers.

Data General, Westboro, Mass., is another computer company rapidly moving into CIM. Its aim is to offer an extensive product platform with a variety of the application-specific software. "DG is not in position to walk into some company and put a turnkey \$5 million flexible manufacturing system in place," said David Allen, manager industry marketing, Technical Products Div., "although we would work very closely with a GE, Westinghouse, CDC, or GCA, in integrating the Data General story into their turnkey solution."

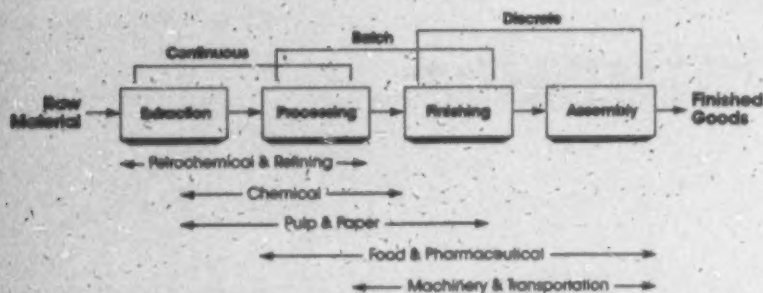
Data General has been moving toward CIM for some time.

"We really started out in the CPU (computer) business, peddling iron to the marketplace," said Mr. Allen. "From there we got more into systems. We now like to talk about our 'integrated product platform.' This is basically what we are supplying to many of our major OEMs."

Computer Hardware

If a computer system starts with

Industrial Production Cycle



With its new integrated control systems architecture for manufacturing automation, Honeywell will be able to address all three elements of the production cycle.

the computer hardware, the next need are systems which define how the hardware is to operate. Then comes the integrated product platform, and on top of that is applications software which addresses specific automation tasks. A key layer is the integrated product platform level which not only is the communications link between the host computer and specific factory automation activities but also transports information from these activities horizontally throughout the factory. Working hard to improve its communication abilities, Data General has announced MAP support while also supporting Ethernet and SNA. Besides developing its integrated product platform, Data General also provides host computers, systems, and application solutions.

Application solutions can involve three areas: engineering design, manufacturing information (MRP), and factory automation.

"We got started in the engineering world about two years ago and now we have most of the popular engineering packages—NASTRAN, ANSYS, and ANVIL, for example—running on our 32-bit supermini-computers," said Mr. Allen. "We are just now putting together a number of solutions in the MRP, simulation area. In the factory automation area, we are forming linkages between a 32-bit CPU or a workstation, and what are really

workers on the factory floor: robots, vision systems, material handling, bar coding, NC, and so on."

To create this link Data General is forming strong relationships with a leading company in a particular field. It already has ties with a major material handling company and a leading sensor I/O manufacturer and is talking with vision and bar coding companies, to name a few. The ties are needed so the customers don't have to do all the work in putting together a system.

"We are saying that we will offer you a 32-bit Data General product. And from a strategic partnership relationship company, you can buy the pretested interface board and the driver software. We are trying to get the customer away from dealing with the interface issues which are always a pain in the neck."

Prime Computer, Inc., Framingham, Mass., produces a broad line of superminicomputers. It is also a company that is moving into the CIM marketplace. Its particular strength is supplying the CAD/CAM market. A major customer, Ford Motor Co., uses Prime systems in a large percentage of its CAD/CAM operations.

Linking Systems

"A lot Prime systems were being used in CAD/CAM," said Robert O. Carper, group marketing manager, Automotive and Aerospace CAD/CAM Business Group. "We believed

we that we could bring together these CAD/CAM systems with business systems, because the multifunctional capability of the Prime product allows you to run engineering systems and business systems equally effectively."

This balance, often not addressed, is found in most environments today. Engineers, for example, usually split their time between a graphics workstation and administrative duties.

Besides having design systems, Prime accommodates a number of popular CAE offerings. CAM is also supported as is computer-aided process planning. Prime can also tie into third-party MRP packages and shop floor systems.

"What we are working toward is having a range of systems working work together on the same system. For example, we have a CAD system, Prime MEDUSA, a drafting and 3-D solids modelling package. At the other end of our product line, we have a data base management system called INFORMATION. Its strength is that it allows people without a great deal of programming experience to access information. What we are doing is creating a link between our CAD system and INFORMATION so the engineer can build the drawing and build the associated specifications, then take it out of that drawing data base and put it into another data base, an engineering management data base. Here, he can work with creating bills of material. He can create part specification listings and he can tie them directly to his MRP system."

NCR, another computer and software developer, has two groups that support CIM. One group makes hardware that runs on the shop floor while the other group has developed MISSION, a comprehensive MRP, accounting, and shop floor control software package.

"We bought Data Passing, Inc., a shop floor hardware producer, about five years ago and they have continued as separate division," remarked Peter J. Augusta, assistant vice president, general purpose systems. "However, they have just this year been integrated into the overall

manufacturing division environment. They have the terminals and we sell the main frames and we will be working more closely with them to integrate their terminals into our manufacturing systems."

Mainframe Link

Another product NCR soon will be offering is a microcomputer to mainframe link. The micro can be then used as either a dumb terminal or a personal computer, running all the major PC software.

"As for the future, We are looking very seriously CAD and the integration of CAD into our MRP system," said Mr. Augusta.

While NCR offers hardware and software CIM solutions, Manufacturing Science America Inc. (MSA) is a firm that markets strictly software, MRP II software. However this software continues to reach into more and more areas of production. Like NCR, MSA sees the growing integration of MRP and CAM, manufacturing management and design.

"The possibility of tying those areas together is getting closer," said Ray L. Dicasali, vice president, Manufacturing Systems Div. "The biggest problem we have to overcome is making the CAD data base compatible with the MRP data base. Another area we are looking at is the whole issue of shop floor data collection. Most of it is being tracked manually. We have got terminals that is true but mostly there are pieces of paper flying around, never quite catching up to what they are supposed to be reporting."

The paperwork falls even further behind as plants adopt just-in-time production philosophies.

"It appears we are heading toward a paperless electronic form of communication, however before this communication can become reality the problem of the lack of standards must be addressed. This lack of standards is a real barrier to closing the information loop in a factory. Automated information systems must be tied more closely to the automated hardware that is being installed."

ASK Computer Systems, Inc. is another software firm that now is ad-

What Must Be Integrated Before CIM Can Become Reality

Levels of Automation

LEVEL	REPRESENTATIVE FUNCTIONS	
LEVEL IV COMPANY-WIDE INFORMATION SYSTEMS	- Financial modeling - Business tracing/reporting - Payroll	- General ledger - Credit - Asset management
LEVEL III PLANT-WIDE PLANNING & CONTROL (Plant Manager)	- MRP - Work in process - labor reporting - Cost control - Quality control	- Planning/scheduling/forecasting - Inventory control - CAD interface - Order entry
LEVEL II SUPERVISORY (Department Manager)	- Report generation - Operations analysis/control - Optimization planning - Change control	- Recipe/program storage & control - Data base maintenance - Operations displays - Maintenance scheduling
LEVEL I MACHINE/WORK CELL (Factory Floor)	- Closed loop control - Sequence and logic control - Source data entry	- Specialty controllers - Robotics control - LANS
LEVEL 0 COMPONENT SENSOR	- Pressure, temperature, distance, humidity, flow measurement - Transducers - Relays, switches	- Operator interface - Data acquisition - Transmitters - Object recognition

Source: Honeywell

ressing the CIM environment. "The big challenge to running an MRP system like ours is to make sure that it is accurate and up-to-date all the time," said Kenneth A. Fox, vice president of the Los Altos, Calif., firm. "In other words, the general objective is to try and get very high accuracy in the inventory records, which is nothing more than a making sure that what the computer thinks is in inventory is in fact what is in inventory. Today in most MRP systems, ours included, that tracking is done by people entering inventory transactions, releasing shop paper and so on. As the other functions become more automated, it becomes natural to keep the MRP system tracking the manufacturing processes electronically."

ASK sees a logical link between automated storage and retrieval sys-

tems (AS/RS). Since AS/RS automates the stockroom, why should stockroom information have to be manually put into an MRP system?

ASK also is working on tying MRP to CAD. "This is the interface that our customers see as most important," said Mr. Fox, "because more people own CAD systems than any other of the islands of automation. We are also working on streamlining data entry on the shop floor via bar code readers. Another development I see coming in a year or so is an MRP link with automated test equipment. We have a quality data management package under development."

Many more companies than the few mentioned are expanding their lines to meet the increasing demand for CIM products. And this initial demand is only the beginning.

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective February 18, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	185	163	160	239
Pittsburgh	223	198	184	298
Youngstown	97	101	97	120
Lake Erie	161	151	139	129
Detroit	136	134	136	152
Chicago	451	456	439	547
Cincinnati	88	87	82	99
St. Louis	76	71	77	85
Southern	171	173	154	200
Western	86	85	82	81
U.S. Production	1,674	1,619	1,550	1,961

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80% premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81

86.9¢—U.S. Steel as of 3/15/82 Cleveland Cliffs as of 2/26/82 Oglebay Norton as of 3/25/82 and Hanna Mining as of 2/26/82

**Effective 8/1/83

NONFERROUS PRICES

(Effective February 18, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	-date of change
Aluminum (LME)	50.47	49.86	2/18/85
Copper (C)	67.00- 68.00	66.50- 67.00	2/13/85
Lead	13.00- 21.00	19.00- 21.00	2/12/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	229.57	228.76	2/18/85
Titanium Sponge	555.00- 585.00	555.00	4/29/82
Zinc	43.00	43.00- 45.00	1/22/85

—ALUMINUM Avg. for last week & previous week COPPER (C) = cathode LEAD common grade MAGNESIUM 99.8% pig delivered NICKEL Avg. for last week & previous week Canada, ZINC high grade

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$140.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.25-1.55
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$304.00
Indium, dollars per troy oz.	\$3.10
Iridium, dollars per troy oz.	\$475.00
Magnesium sticks, 10,000 lbs.	\$1.97
Mercury, per 76-lb. f.o.b. N.Y.	\$310.00-319.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective February 18, 1985)

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
U.S. Steel Production				
Net tons, in thousands	1,674	1,619	10,439	12,262
Capability Utilization Rate	64.7	62.5	60.0	69.9

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base*				
(¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	26.822
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$83.83	\$82.50	\$81.50	\$95.17
No. 2 bundles	\$55.83	\$54.83	\$53.50	\$63.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$89.50	\$86.50	\$83.50	\$103.50
No. 1 steel, Philadelphia	81.50	80.50	80.50	91.50
No. 1 steel, Chicago	80.50	80.50	80.50	90.50
No. 1 bundles, Detroit	75.50	75.50	70.50	101.50
Low Phos., Youngstown	72.50	72.50	72.50	104.50
No. 1 mach'y cast., Pgh	71.50	71.50	66.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	100.50
No. 1 mach'y cast., Chi	111.50	111.50	111.50	111.50

*Finished Steel Composite. Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$129.00
Platinum, per troy oz.	\$273.00
Rhodium, per troy oz.	\$1,030.00
Silver ingots, per troy oz.	\$6.265
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Feb. 11—\$17.52	Feb. 14—\$17.66
Feb. 12—Holiday	Feb. 15—\$17.52
Feb. 13—\$17.52	

Scrap Prices Brass Mill Scrap

(Cents per lb. over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	61½	52¼
Yellow brass	55	50½
Red brass	57¾	51
Comm. bronze	58¾	51¾
Mang. bronze	57½	47
Free cutting rod ends	53	52

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	57
No. 2 copper wire	49
Light copper	40

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	45
Light copper	36
No. 1 composition	47
No. 1 comp. turnings	45
Hvy. yellow brass solids	35
Hvy. yellow brass turnings	33
Radiators	38

Aluminum		
New mixed clips	35	— 36
Old sheet	33	— 34
Old cast	33	— 34
Clean dry borings	34	— 35

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	29	— 30
Mixed L.C. clips	27	— 28
Old sheets and cast	24	— 26
Borings and turnings	22	— 23
Duraluminum clippings	25	— 26

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 38
Light copper	32	— 33
Radiators	32	— 33
No. 1 composition	40	— 41
No. 1 composition turnings	37	— 38
Cocks and faucets	30	— 32
Clean heavy yellow brass	28	— 29
Brass Pipe	28	— 29
New soft brass clippings	41	— 42

Lead

Heavy soft-lead	9	— 10
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 14

Nickel

Nickel solids	115	— 120
Nickel rod ends	115	— 120
Nickel sheets, clips	115	— 120
Nickel turnings	40	— 45

Zinc

New zinc clippings	19	— 19
Old diecast zinc	14	— 15

EFFECTIVE FEBRUARY 18, 1985

(Effective February 18, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 89.00 to \$ 90.00
No. 2 hvy. melting	79.00 to 80.00
No. 1 dealer bundles	107.00 to 108.00
No. 1 factory bundles (auto)	96.00 to 97.00
No. 2 bundles	56.00 to 57.00
No. 1 busheling	107.00 to 108.00
Machine shop turnings	10.00 to 11.00
Shoveling turnings	51.00 to 52.00
Cast iron borings	49.00 to 50.00
Low phos. punchings plate	109.00 to 110.00
Heavy turnings	79.00 to 80.00
No. 1 RR hvy. melting	93.00 to 94.00
Rails, 2 ft. and under	112.00 to 113.00
Scrap rails, random lgth	94.00 to 95.00
RR specialties	102.00 to 103.00
No. 1 machine cast	71.00 to 72.00
Cupola cast	64.00 to 65.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	590.00 to 600.00
18-8 turnings	490.00 to 500.00

Chicago

No. 1 hvy. melting	\$ 80.00 to \$ 81.00
No. 2 hvy. melting	75.00 to 76.00
No. 1 dealer bundles	99.00 to 100.00
No. 1 factory bundles (auto)	96.00 to 97.00
No. 2 dealer bundles	59.00 to 60.00
No. 1 busheling	95.00 to 97.00
Shredder scrap	96.00 to 97.00
Machine shop turnings	44.00 to 45.00
Mixed borings and turnings	45.00 to 46.00
Shoveling turnings	50.00 to 51.00
Cast iron borings	50.00 to 51.00
Low phos. large drop	116.00 to 117.00
Low phos. punchings plate	
1 1/4 in. and heavier	129.00 to 130.00
Low phos. 2 ft. and under	124.00 to 125.00
No. 1 RR hvy. melting	92.00 to 93.00
Scrap rails, random lgth	92.00 to 93.00
Reinforcing bars	107.00 to 108.00
Rails, 2 ft. and under	116.00 to 117.00
RR couplers and knuckles	101.00 to 102.00
RR car axles	123.00 to 124.00
No. 1 machinery cast	111.00 to 112.00
Cupola cast	99.00 to 100.00
Stove plate	97.00 to 98.00
Steel car wheels	104.00 to 105.00
Stainless	
18-8 bundles and solids	530.00 to 540.00
18-8 turnings	450.00 to 460.00
430 bundles and solids	135.00 to 140.00
430 turnings	105.00 to 110.00

Philadelphia

No. 1 hvy. melting	\$ 80.00 to \$ 83.00
No. 2 hvy. melting	70.00 to 73.00
No. 1 dealer bundles	91.00 to 94.00
No. 2 dealer bundles	50.00 to 53.00
No. 1 busheling	91.00 to 94.00
Shredder scrap	101.00 to 104.00
Machine shop turnings	26.00 to 29.00
Mixed borings and turnings	26.00 to 29.00
Shoveling turnings	38.00 to 41.00
Low phos. 5 ft. and under	90.00 to 93.00
Low phos. 2 ft. punchings	110.00 to 113.00
Electric furnace bundles	104.00 to 107.00
RR specialties	90.00 to 93.00
Rails, 2 ft. and under	112.00 to 115.00
Cupola cast	80.00 to 83.00
Heavy breakable cast	57.00 to 60.00
No. 1 machinery cast	97.00 to 100.00

Detroit

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 58.00 to \$ 59.00
No. 2 hvy. melting	57.00 to 58.00
No. 1 dealer bundles	75.00 to 76.00
No. 2 bundles	35.00 to 36.00
No. 1 busheling	74.00 to 75.00
Drop large flashings	45.00 to 46.00
Machine shop turnings	48.00 to 49.00
Mixed borings and turnings	24.00 to 25.00
Shoveling turnings	49.00 to 50.00
Cast iron borings	31.00 to 32.00
Heavy breakable cast	40.00 to 41.00
Mixed cupola cast	56.00 to 57.00
Automobile cast	80.00 to 81.00
Stainless	
18-8 bundles and solids	465.00 to 475.00
18-8 turnings	370.00 to 380.00
430 bundles and solids	110.00 to 120.00

Youngstown

No. 1 hvy. melting	\$ 69.00 to \$ 72.00
No. 2 hvy. melting	52.00 to 55.00
No. 1 dealer bundles	81.00 to 84.00
No. 2 dealer bundles	35.00 to 38.00
Machine shop turnings	11.00 to 14.00
Shoveling turnings	16.00 to 19.00
Low phos. plate	71.00 to 74.00
Electric furnace bundles	69.00 to 72.00
Galvanized bundles	59.00 to 62.00

Cleveland

No. 1 hvy. melting	\$ 58.00 to \$ 61.00
No. 2 hvy. melting	34.00 to 37.00
No. 1 dealer bundles	73.00 to 76.00
No. 1 factory bundles	79.00 to 82.00
No. 2 bundles	22.00 to 25.00
No. 1 busheling	75.00 to 78.00
Machine shop turnings	6.00 to 9.00
Mixed borings and turnings	6.00 to 9.00
Shoveling turnings	7.00 to 10.00
Cast iron borings	10.00 to 13.00
Cut structural & plates	
2 ft. and under	110.00 to 113.00
Low phos. punchings plate	110.00 to 113.00
Drop, large flashings	40.00 to 43.00
Foundry steel, 2 ft. and under	57.00 to 60.00
No. 1 RR hvy. melting	73.00 to 76.00
Rails, 2 ft. and under	117.00 to 120.00
Rails, 18 in. and under	118.00 to 121.00
Steel axle turnings	58.00 to 59.00
Railroad cast	99.00 to 101.00
No. 1 machinery cast	99.00 to 101.00
Cupola cast	55.00 to 58.00
Stove plate	41.00 to 44.00
Stainless	
18-8 bundles	375.00 to 385.00
18-8 turnings	325.00 to 335.00
430 bundles	80.00 to 85.00

Buffalo

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 67.00 to \$ 68.00
No. 2 hvy. melting	55.00 to 56.00
No. 1 busheling	79.00 to 80.00
No. 1 dealer bundles	79.00 to 80.00
No. 2 bundles	40.00 to 41.00
Machine shop turnings	16.00 to 17.00
Mixed borings and turnings	17.00 to 18.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	24.00 to 25.00
Low phos. plate	97.00 to 98.00
Structural and plate	
2 ft. and under	100.00 to 101.00
Rails, 2 ft. and under	100.00 to 101.00
Scrap rails, random lgth	74.00 to 75.00
No. 1 machinery cast	80.00 to 81.00
No. 1 cupola cast	60.00 to 61.00

St. Louis

No. 1 hvy. melting	\$ 64.00 to \$ 65.00
No. 2 hvy. melting	53.00 to 54.00
Foundry steel, 2 ft.	61.00 to 62.00
No. 1 dealer bundles	64.00 to 65.00
No. 2 bundles	48.00 to 49.00
Machine shop turnings	17.00 to 18.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	27.00 to 28.00
No. 1 RR hvy. melting	64.00 to 65.00
Rails, random length	65.00 to 66.00
Rails, 18 in. and under	81.00 to 82.00
RR specialties	80.00 to 81.00
Cupola cast	74.00 to 75.00
Heavy breakable cast	52.00 to 53.00
Stove plate	89.00 to 90.00
Steel car wheels	97.00 to 98.00
Reinforcing rails	78.00 to 79.00
Unstripped motor blocks	61.00 to 62.00

Birmingham

No. 1 hvy. melting	\$ 73.00 to \$ 74.00
No. 2 hvy. melting	69.00 to 70.00
No. 1 dealer bundles	77.00 to 78.00
No. 2 bundles	50.00 to 51.00
No. 1 busheling	77.00 to 78.00
Shredder scrap	99.00 to 100.00
Machine shop turnings	29.00 to 30.00
Shoveling turnings	42.00 to 43.00
Cast iron borings	39.00 to 40.00
Electric furnace bundles	74.00 to 75.00
Elec. furnace, 3 ft. and under	74.00 to 75.00
Structural and plate, 2 ft.	100.00 to 101.00
Structural and plate, 4 ft.	92.00 to 93.00
No. 1 RR hvy. melting	92.00 to 93.00
Scrap rails, random lgth	90.00 to 91.00
Rails, 2 ft. and under	105.00 to 106.00
Angles and splice bars	92.00 to 93.00
No. 1 cupola cast	87.00 to 88.00
Unstripped motor blocks	75.00 to 76.00

Cincinnati

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 52.00 to \$ 53.00
No. 2 hvy. melting	51.00 to 52.00
No. 1 dealer bundles	63.00 to 64.00
No. 2 bundles	25.00 to 26.00
Machine shop turnings	4.00 to 5.00
Shoveling turnings	6.00 to 7.00
Cast iron borings	17.00 to 18.00
Low phos. 18 in. and under	84.00 to 85.00
Rails, random length	65.00 to 66.00
Rails, 2 ft. and under	78.00 to 79.00
No. 1 cupola cast	58.00 to 59.00
Heavy breakable cast	25.00 to 26.00
Drop broken cast	75.00 to 76.00

New York

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 47.00 to \$ 48.00
No. 2 hvy. melting	38.00 to 39.00
No. 2 dealer bundles	23.00 to 27.00
Mixed borings and turnings	11.00 to 13.00
Machine shop turnings	6.00 to 7.00
Shoveling turnings	14.00 to 15.00
Clean cast, chem. borings	35.00 to 36.00
No. 1 machinery cast	89.00 to 90.00
Mixed yard cast	50.00 to 51.00
Heavy breakable cast	10.00 to 12.00
Stainless	
18-8 prepared solids	495.00 to 515.00
18-8 turnings	395.00 to 415.00
430 prepared solids	90.00 to 110.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 58.00 to \$ 60.00
No. 2 hvy. melting	48.00 to 50.00
No. 1 dealer bundles	58.00 to 60.00
No. 2 bundles	35.00 to 37.00
No. 1 busheling	65.00 to 67.00
Shredder scrap	65.00 to 67.00
Machine shop turnings	10.00 to 12.00
Shoveling turnings	18.00 to 20.00
No. 1 machinery cast	81.00 to 86.00
Mixed cupola cast	48.00 to 50.00
Heavy breakable cast	8.00 to 10.00

San Francisco

No. 1 hvy. melting	\$ 44.00 to \$ 46.00
No. 2 hvy. melting	38.00 to 40.00
No. 1 dealer bundles	35.00 to 37.00
No. 2 dealer bundles	20.00 to 22.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	8.00 to 9.00
No. 1 cupola cast	81.00 to 83.00

Los Angeles

No. 1 hvy. melting	\$ 47.00 to \$ 49.00
No. 2 hvy. melting	40.00 to 42.00
No. 1 dealer bundles	38.00 to 40.00
No. 2 dealer bundles	20.00 to 22.00
Machine shop turnings	13.00 to 14.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	8.00 to 9.00
Elec. furnace, 1 ft. and under (foundry)	74.00 to 76.00
No. 1 cupola cast	75.00 to 77.00

Seattle

No. 1 hvy. melting	66.00 to 68.00
No. 2 hvy. melting	57.00 to 59.00
No. 2 bundles	40.00 to 42.00
No. 1 cupola cast	92.00 to 93.00
Mixed yard cast	82.00 to 84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 86.00
No. 2 hvy. melting, cut 2 ft. and under	78.00
No. 1 dealer bundles	84.00
No. 2 bundles	60.00
Mixed steel scrap	57.00
Bush, new fact. prep'd	86.00
Bush, new fact. unprep'd	75.00
Machine shop turnings	31.00
Short steel turnings	33.00
Mixed borings and turnings	25.00
Cast scrap	85.00

Houston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 74.00 to \$ 75.00
No. 2 hvy. melting	61.00 to 62.00
No. 2 bundles	46.00 to 47.00
Machine shop turnings	14.00 to 15.00
Crushed turnings	31.00 to 33.00
Shredder scrap	78.00 to 79.00
Cut structural plate, 2 ft. and under	105.00 to 106.00
Cut structural plate, 5 ft. and under	89.00 to 90.00
Unstripped motor blocks	60.00 to 61.00
Cupola cast	82.00 to 83.00

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IRON AGE

MANUFACTURING MANAGEMENT



2ND QUARTER
MANUFACTURING FORECAST:
**CLEAR SAILING
AHEAD**

**SUPERPLASTICITY: A NEW
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MANUFACTURING FORECAST

CLEAR SAILING AHEAD

BY JOHN D. BAXTER

Business executives are confident of a solid first half, and only a few see a recession starting during the last half.

Don't worry about business recovery in 1985.

A continuance of the business expansion is in the bag for the first half of the year.

Beyond that, the rest of the year looks promising.

Those are the views that come from listening to many economists in recent weeks.

Said Albert T. Sommers, former chief economist of the Conference Board, "There is no business cycle out there in 1985." In other words, the business expansion of 1984 will roll on through this year.

Paul A. Volcker, chairman of the Federal Reserve Board went further. In mid-February, he told Congress he was more worried about fast economic growth this year than he was about the dangers of a recession.

Business executives, generally, seem less sanguine than economists about 1985 prospects. But at least two recent surveys indicate that business executives are confident of

a solid first half, and only few see a recession starting during the last half.

Still, in the matter of pace of recovery, few, if any, economists and executives see economic growth this year matching the very strong showing of 1984.

For example, last year the U.S. economy, as measured by inflation-adjusted Gross National Product, grew by 6.8 pct. A range of recent forecasts of 8 top economists points to a growth rate this year of 3.5 pct to 4.5 pct.

Even Reagan Administration economists forecast a slower growth rate this year than last. They are betting on a 4 pct growth rate. And the traditionally conservative Congressional Budget Office has projected growth of 3.5 pct for this year.

Signals Are Green

So, for the first half this year—if the seers are on target—the economic setting in which U.S. metalworking industries will be operating looks to be a healthy one. Incoming orders should continue to climb—at least, for most durable goods manufacturers. Factory operating rates should edge upward further.

The icing on this 1985 cake is an almost certain continuance of low inflation rates, and interest rates that seem destined to move up only mod-

erately, if at all. Prices have held in line now for two full years, and no excesses can be seen emerging in the near-term economy that might change things.

Held-in-check prices, in turn, can be expected to hold a rein on interest rates. Michael E. Levy, a Conference Board economist thinks a dip in interest rates could be in the offing this year. This is possible, he says, because of "improved inflationary expectations" that are modifying historical patterns of rising rates in the third year of economic recovery. Too, interest rates are already at near record-high levels in relation to overall inflation rates.

Beyond well-contained prices and interest rates, why is there so much confidence about the first half this year?

For one, there is the matter of sheer momentum. The 1984 GNP growth of 6.9 pct was the strongest scored in 34 years.

And, secondly, with prices and interest rates behaving well, and the Fed in a benevolent mood, no block is now seen just ahead on the fast-growth track.

If there is any hard-to-get down ingredients in the first half 1985 'piece of cake,' they are in slowing gains in corporate profits and in continued severe import competition.

Net Increase in Annual Sales, 1972 Dollars



10,000,000

Source: U.S. Commerce Dept.

Net Increase in Annual Sales, 1972 Dollars



20,000,000

Source: U.S. Commerce Dept.

Net Increase in Annual Sales, 1972 Dollars



10,000,000

Source: U.S. Commerce Dept.

Profits will be up but not likely anywhere near the 15 pct growth rate clip of last year. Earnings growth will be slowed because the price relief path will be largely shut off to durable goods producers. The low inflation rate and continued strong inflow of imports will combine to rein in corporate earnings.

Price pressures, of course, were on the scene last year. But, at that time, these pressures didn't hold back corporate profits because manufacturers, for the second straight year, worked down their breakeven points to rock-bottom levels. In other words, corporate costs came down more steeply than prices—and the payoff came in fatter profits.

But...there is little room left this year for corporations to get their breakeven points down any further. This means the hold-the-price environment this year will take a toll on bottom lines.

The Import Scourge

Imports, of course, will remain a scourge this year. They hit not only directly on U.S. industry bottom lines, but on corporate revenues and market shares. Last year, the U.S. trade deficit in manufactured goods hit a staggering record total of \$88.5 billion, up from \$38.2 billion in 1983.

Hopefully, however, import pres-

sures this year may be less severe than last year. This is because the U.S. is expected to experience an economic growth rate more in line with other industrial nations. In 1984, U.S. growth ran well ahead of that of most other nations. This made the U.S. ripe for imports of all kinds. When foreign manufacturers couldn't sell at home in the face of their own sluggish economies, they turned eagerly to big bustling U.S. markets.

So, if the U.S. economic growth rate does slow down this year as widely predicted, it could have an ameliorating effect on import competition. Foreign manufacturers will have faster-growing domestic market needs to fill and the U.S. market won't be the only game in town.

Will the Dollar Fall?

Another factor that points to lessened import pressures this year is the possibility that there will be some kind of soft landing for the soaring value of the U.S. dollar. Most economists, it seems, feel the dollar simply has to crack a bit. They feel it is too far out of line with just about all other currency values of the world. The dollar has soared to a level 76 pct higher than in July 1980 as measured against a broad mix of major foreign currencies.

This widely-held belief in an im-

minent easing of the dollar's strength has taken on fresh credence in light of world economic growth rates getting into better alignment. Too, U.S. interest rates have lately been less out of line with foreign rates. This trend trims world demand for U.S. interest-bearing securities and thus tends to sap some of the dollar's strength.

Still, there seems to be wide agreement that the 'demon dollar' will continue as a threat to continued U.S. business growth until, or unless, steps are taken to bring the Federal budget deficit under control.

However, that dark-cloud threat hangs mostly over 1986; very little of it threatens stormy problems for this year. That means sunny skies are almost certain to continue through at least the first half of 1985.

If a tax bill shapes up quickly as part of the Washington effort to get the budget under control, then there could be an impact on business this year. This would be true if the Treasury's proposed corporate tax disincentives look as though they might shape up as a Congressional bill. Business might be discouraged enough to pull in its oars in 1985—even though the tax bill might be set for 1986 implementation. □

STEEL

What's the breakeven point of steel industry?

For producers of steel sheet in the first quarter, it was probably over 100 pct of capacity. Demand was strong enough for sheet mills to use most of the capacity they cared to activate. Nevertheless, large losses were reported by LTV, Bethlehem Steel and National Steel Corps.

National's loss pinpointed the industry's trouble. National makes sheet almost exclusively. Sheet products accounted for most of the rise of more than 1 million tons in steel shipments in the first quarter.

National was profitable in the fourth quarter of 1984 and in the full year. Yet, the company lost money on added volume in the first quarter of 1984. The explanation of the red ink was that steel prices went to pot. There was some deterioration in the fourth quarter of 1984 when demand lagged. Prices slipped another notch in the first quarter.

As to why this happened, there's no question competition in the domestic industry was an immediate cause. At least two large mills reportedly set out to expand their market shares. According to domestic producers, however, the ultimate cause of price weakness was the continued heavy flow of foreign steel.

Under the voluntary restraint program of the Reagan Administration, steel imports are supposed to be reduced by from 5 million to 6 million tons in 1985. The reduction was actually supposed to start last October. That didn't happen. Imports were heavier than ever in the fourth quarter and there was a further jump in January.

If there is no sign of foreign restraint in the next week or two, domestic producers will begin renewing their agitation for legislated quotas and prompt enforcement of the unfair trade laws.

Time is of the essence for steel companies. By March, people were starting to talk about the next recession. This was being predicted for 1986 by some economists. For the snake-bitten steel industry, it would be par for the course if the import restraints started working just when there was no market left to protect.

Time was also running out in another sense. The steel industry as a whole has lost money for the last three years. The aggregate three-year deficit was probably around \$7 billion. Another display of red ink was indicated for the first quarter of 1985. Bethlehem said it could lose as much as \$80 million in the quarter. LTV said its deficit would be worse than expected.

The profit drought can't continue indefinitely without producing some dropouts. People have been warning of steel bankruptcies for the past three years. There have been two failures, but the largest companies have managed to hang on.

Now, the day of reckoning may have arrived. In March, Wheeling-Pittsburgh Steel Corp. was negotiating with lenders and United Steelworkers of America (USWA) in an effort to defer obligations.

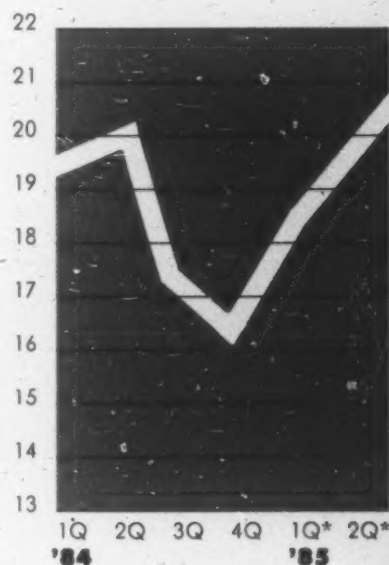
Bethlehem Steel was seeking an infusion of equity capacity through the sale of 5 million shares of common stock. The company was asking shareholders to authorize a larger increase in the number of common shares outstanding.

Sharon Steel Corp. plans to sell some assets to meet a \$23 million interest payment due March 1.

What made these developments so ominous is that only a limited amount of price relief is expected in coming months. Steel men are hoping demand will improve enough to end the extreme discounting of recent weeks, but few expect a sustained upward movement of prices.

Steel men are hoping demand will improve enough to end the extreme discounting.

Steel Shipments
In Millions of Tons



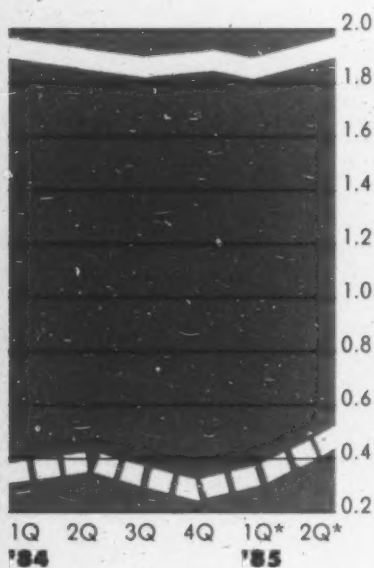
Source: AISI
*IA estimate

NONFERROUS

(Declining) inventories at the producer and hedge market levels could help firm up second quarter pricing.

Nonferrous Metals Shipments

In Millions of Short Tons



■ Aluminum
■ Copper

Source: American Bureau of Metal Statistics,

Aluminum Assn.

*1A estimate

Industrial consumption of basic nonferrous metals was running at a good clip in the first quarter, but the metals producers are having trouble translating this into better prices.

The high-flying dollar and attendant imports of lower-priced foreign supplies are the main impediment, but the underlying limiting factor remains the ready availability of base metals and conservative buying policies in the manufacturing sector. Inventories at the producer and hedge market levels continue to decline by varying degrees, depending on the metal, and this could help firm up second quarter pricing.

Copper prices firmed in the opening weeks of the first quarter, but faltered again in February despite continued improvement in market fundamentals. Early March values didn't exactly roar in like a lion, but growing talk of tighter supplies as 1985 wears on, combined with continued improvement in consumption, was expected to provide the groundwork for another attempt at price recovery.

The capital goods sector, which accounts for about 55 pct of copper demand, appears to be in the early stages of an up-cycle as capital appropriations are translated into firm orders. There also are possibilities of production losses in South America and elsewhere for reasons ranging from neglected maintenance to the socio-political problems.

The nickel industry, which depends on the capital goods sector for about 60 pct of its output, also seems to have a better hold on the inventory situation. London Metal Exchange (LME) stocks fell substantially last year and were still zig-zagging lower in the first quarter of 1985. Nickel production was held closer to market requirements in 1984 and the trend continues.

LME nickel prices fluctuated er-

atically in the first quarter, reflecting in large part the foreign exchange situation, but the overall upward trend, in both dollar and pound sterling prices, reflected the changed inventory situation and improvement in consumption.

The capital goods sector accounts for only 25 pct of aluminum demand, putting it only a point or two ahead of the aluminum beverage can market alone, but improvement in this area will help to pick up some developing slack elsewhere.

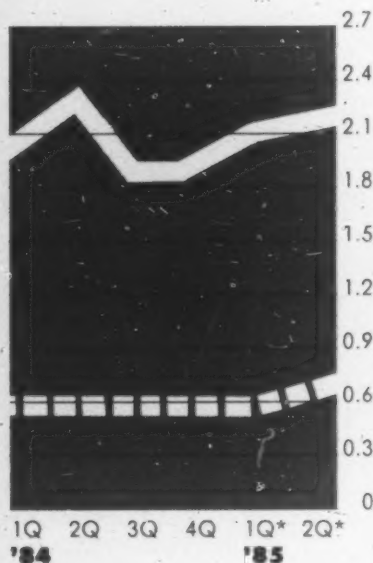
Aluminum industry incoming order rates half-way through the first quarter were running about 10 pct under year-earlier rates. Although the order rate in the early 1984 period included some double-booking against possibilities of price hikes, the pace in the 1985 period nonetheless was disappointing. Can stock orders were down 13-14 pct through mid-February. An industry-wide price freeze on can stock was due to expire March 31.

Ingot prices remained weak as the first quarter drew to a close despite sizable production cuts put into effect or scheduled. Further cutbacks were expected before midyear. Free world primary aluminum output jumped 15 pct last year from depressed 1983 levels. Most of the production cutbacks were made by U.S. producers, who accounted for most of the gains in 1984, but production has continued upward in Australia/New Zealand and Latin America. Aluminum ingot prices should improve as output curbs reduce metal available for delivery to the hedge markets. This should provide direct and psychological support for recovery in mill product prices as well. One of the keys, on the U.S. market at least, is how firm the capital goods sector develops in coming months and how long the automotive market holds up.

AUTOMOTIVE

The big question mark in the second quarter and in the years ahead is how many cars the Japanese will sell here.

Automotive, Sales
In Millions of Units



— Domestic
- - Imports

Source: Motor Vehicle Manufacturers Assn.

*A estimate

U.S. automakers expect to sell 2.2 million cars in the second quarter, up slightly from the estimated 2.1 million sales in the first quarter.

The big question mark in the second quarter and in the years ahead is how many cars the Japanese will sell here. The voluntary restraint agreement (VRA), under which the Japanese limited imports to 1.9 million units per year, ended March 31.

Most automakers and analysts expect Japanese sales here to increase by 300,000-400,000 units in 1985, to a total of 2.2-2.3 million.

The Japanese likely will sell another 75,000-100,000 units here in the second quarter, raising total import sales in the second quarter to about 700,000 units. Imports could increase by about another 75,000 units with each new quarter, raising total import sales in 1985 to 2.8 million units. That includes 500,000 imports from Europe.

Those are conservative estimates. The Japanese say that capacity constraints will limit their increase in exports to the U.S. to 600,000 more units from March 31, 1985 to March 31, 1986. Chrysler foresees an increase of 650,000 Japanese exports in the same period. U.S. Special Trade Representative William Brock estimated 750,000 more units will be shipped from Japan.

Imports, which captured 23 pct of the U.S. market in the first quarter, "will rise to 29 pct by the fourth quarter and 40 pct in three years," said the sales analyst for one U.S. automaker. "In ten years, 50 pct of the U.S. market could consist of Japanese imports, Japanese cars built in the U.S., and cars built by U.S./Japanese joint ventures with a 50/50 U.S./Japanese content. In addition, ...10 pct of the parts used in domestic U.S. cars will be from Japan."

The U.S. automakers want to profit from the increase in imports.

Chrysler, which opposed the ending of the VRA, has announced plans to import 200,000 more small cars per year from Mitsubishi. Chrysler already imports 87,500 units from Mitsubishi, its Japanese affiliate.

General Motors, which favored the end of the VRA, wants to increase shipments from its Japanese affiliates, Isuzu and Suzuki, from the 50,000 units to 200,000 units.

Mitsubishi, Isuzu, Suzuki, and Mazda are the Japanese automakers most likely to increase exports to the U.S., since the VRA severely constrained their exports to the U.S.

Toyota, Nissan and Honda, on the other hand, possibly will show more restraint. Under VRA, Japan's Ministry of International Trade and Industry gave Japan's Big 3 the largest share of the U.S. export market.

In announcing his decision to end the VRA, President Reagan stated his belief "in the wisdom of maintaining the principle of free and fair trade for the benefit of the world's consumers." In testimony before a House subcommittee, GM's chief economist stated the same: "Removal of the restraints," said GM's Dr. Marina Whitman, "will serve the interests of individual consumers and our nation's economy." Chrysler and the United Autoworkers, on the other hand, forecast the loss of thousands of jobs in the U.S.

By the fourth quarter, the increase in Japanese shipments could mean good deals on the imports for U.S. consumers. Automakers expect overall consumer confidence to remain high and the prime interest rate to rise by no more than 1 pct during the year.

The automakers also expect fuel prices to continue to hover between \$1 and \$1.25 per gallon. That will ensure demand for larger cars, which in turn will ensure continued profits for Detroit in the near term.

MACHINE TOOLS; FLUID POWER

MACHINE TOOLS—A bundle of mysteries is the way one machine tool builder described the outlook for the next several months.

Those mysteries include the fate of industry's Section 232 trade petition's, the effect a possible surge of Japanese auto imports might have on domestic automotive capital spending, and the trend of the rest of the U.S. economy over the next several months.

Many in the industry are predicting a shakeout over the next few years as foreign competition, in stand-alones particularly, becomes worse from a price standpoint.

"There's no future for a single machine company," said one builder. "The numbers are too far apart."

Still, there are some optimists in this area of machine tool industry. "If we had a more realistic dollar abroad and if the yen were truly reflective of the Japanese economy, we might be able to predict a good future for single machine producers in the U.S.," said one industry analyst.

Also causing the industry some worry is the end of official restrictions on Japanese cars. "It's obviously premature to discuss, but I will say I don't see how it can help us," said one lathe maker. "I don't believe the Japanese have any intention of self-control in this area."

As far as the economy in general, however, a few major systems companies are more optimistic than they have been in years. "We see steady growth in all of our markets throughout the decade and beyond. The equipment we're producing is just too productive to ignore," said one company vice president.

The first quarter in domestic machine tool sales showed a continuation of the upward trend set in early 1984. Most expect that trend to continue steadily up as the industry enters the second quarter of 1985.

FLUID POWER—The \$5.9 billion fluid power industry should advance in the second quarter, after a good showing in the first quarter of 1985. But despite the strength that many companies enjoyed even in the second half of 1984, there is a lot of caution about the year ahead.

The *Iron Age* forecast for the first and second quarters is up about 17 pct in the first quarter of 1985, over the closing quarter of 1984, and up 5 pct in the second quarter over the first quarter of 1985.

Data from the National Fluid Power Association, for example, showed a remarkable 35 pct gain in January 1985 hydraulic orders over December, and a moderate gain in pneumatics orders of about 12 pct. Combined gains for the total association membership were up about 26 pct, January over December 1984.

Company reports vary widely, because of the wide range of markets they serve. But an executive of Milwaukee Cylinder, part of Versa Tek, said he saw 1985 up about 5 pct (which coincided with the *Iron Age* forecast for the year, and he expected the second quarter to show about a 5 pct gain; which also reflected the *Iron Age* forecast (see chart).

But Milwaukee Cylinder had a strong fourth quarter, after gains late in the third quarter, which was not a typical late 1984 performance.

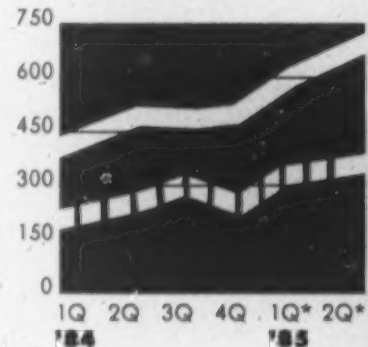
There are other exceptions, that point up the difficulty of getting a full picture of the fluid power industry.

For 1985's second quarter: a mixed but stronger forecast over the first quarter.

But for the total picture for 1985, there is somewhat less optimism than earlier projections despite an upward revision of NFPA's 1984 sales totals to \$5.9 billion from earlier reports of about \$5.5 billion for the year.

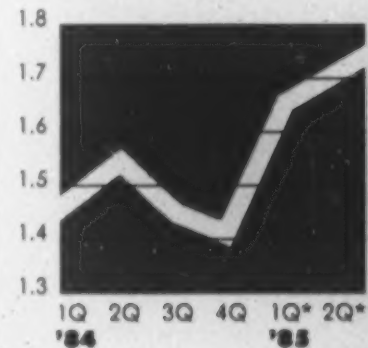
The first quarter in domestic machine tool sales continued the upward trend of 1984.

**Machine Tools
Net New Orders**
In Millions of Dollars



Source: National Machine Tool Builders Assn.
*1A estimate

Fluid Power, Shipments
In Billions of Dollars



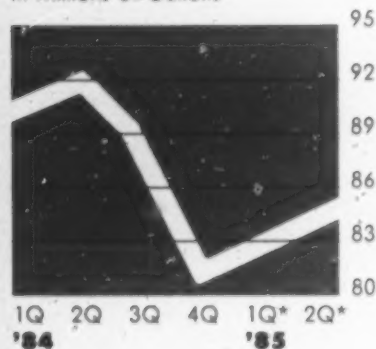
Source: U.S. Department of Commerce and NFPA
*1A estimate

COATINGS; PLASTICS

The outlook for coatings is for a slow '85 with shipments down 8 pct and inventories that are still too high.

Industrial Coatings Shipments

In Millions of Gallons

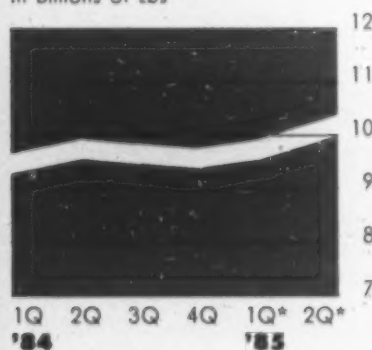


Source: U.S. Department of Commerce

*1A estimate

Plastic Resins Sales & Captive Use

In Billions of Lbs



Source: SPI Committee on Resin Statistics

as compiled by Ernest & Whinney

*1A estimate

COATINGS—Industrial-coating companies expect to ship 85 million gallons of coatings in the second quarter. That's 8 pct fewer gallons than in the second quarter of 1984, which was one of the industry's best years ever.

The industry shipped about 83 million gallons in first quarter '85. That also was fewer than last year's shipments of 90 million gallons.

The problem is an excess of inventory from last year, particularly in metal buildings. Hardest-hit has been the aluminum-building market, down 20 pct from last year's first quarter.

"There was a tremendous inventory of housing built in the second half of 1984," said the vice president of one major Midwestern coatings firm. "Now the aluminum-building market is in chaos. Customers are dropping out left and right."

Total orders for coil coaters could drop off 15 pct from last year's second quarter. Much of that drop is due to the decline of the metal-building market, coil coaters' second largest source of sales after autos.

One major development is the decision of Roll Coater (Greenfield, Ind.) to stop coating the heavy-gage hot-rolled steel used in purlin.

Purlin requires gages of .054-.111 inch. Splicing coils of the heaviest sheet created gages of 1/4 inch, which excessively battered Roll Coater's multipurpose line. Hannah Steel (Birmingham, Ala.), Metal Prep (Houston), and Enamel Plating and Products (Portage, Ind.) can handle the purlin, but Roll Coater's decision eliminates a major buyer for coil coaters. It will continue to coat aluminum roofing and siding material, however.

"If April is as slow as the first part of this year," said one coating executive, "I think 1985 will be a pretty slow year."

PLASTICS—As expected, the first quarter for the plastics industry was fairly good and a 10 billion lb quarter of plastic resins in sales and captive use seems within grasp.

Business was up about 3 pct from both the fourth quarter and the first quarter of 1984. A slight increase, just under 2 pct, is predicted for the second quarter.

Last year was a 39 billion lb year for plastics. This year should pass the 40 billion lb mark with ease.

Among the more active thermosetting plastics, the materials that are becoming more popular are the epoxies and the polyesters, up 18 and 15 pct, respectively. Phenolics, on the other hand, are showing hardly any increase in sales.

Over on the thermoplastics side, the polyvinyl chlorides and polypropylene are both up, by 9 and 8 pct, respectively. And, the polyethylenes are up by about 4 pct.

If all goes according to schedule, 1985 should have several quarters surpassing the 10 billion lb barrier. For the most part, everything depends on the health of housing, packaging, appliances and automobiles.

The domestic plastics industry is still one of the very few U.S. industries enjoying a favorable balance of trade. Imports are sneaking up, however. It would appear that the balance will swing the other way before too long.

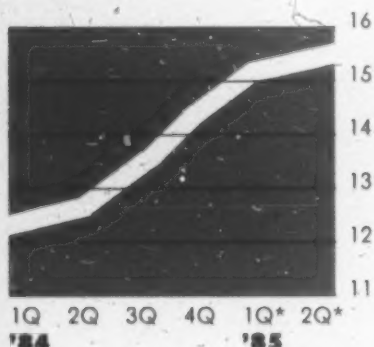
One major breakthrough, in terms of new applications, is the use of sheet molding compounds on the Cadillac Seventy-Five limousine's hood and rear doors.

In the aircraft industry the major breakthrough is the huge wing box on the Lockheed Hercules C-130 air transport which will be made from a graphite-epoxy composite. Both applications are competitive with steel and aluminum.

COMPUTERS; INSTRUMENTS & CONTROLS

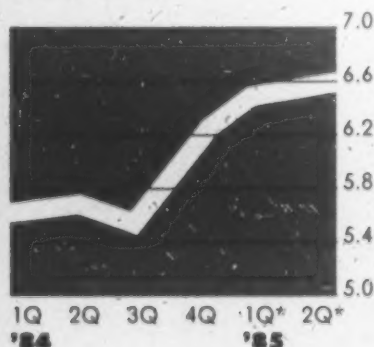
Computers seem to be immune to the business cycle, with runaway growth and few signs of any slowing down soon.

Computers Shipments
In Billions of Dollars



Source: U.S. Department of Commerce
*1A estimate

Instruments & Controls Shipments
In Billions of Dollars



Source: U.S. Department of Commerce
*1A estimate

COMPUTERS—Until a few months ago, little growth was projected for the economy in 1985. Based on this projection, experts expected a falloff in growth in the computer industry from its 20 pct growth rate in 1984 to a rate of 17 pct this year.

However, due to the unexpected strength in the economy, and in capital spending in particular, that decline has not occurred. Through the first two quarters of 1985, the computer industry's growth appears as strong as last year.

Despite the high cost of the U.S. dollar overseas, computer exports are mounting. The Commerce Dept. expects exports to rise this year at a rate approaching 30 pct. Many countries, especially those in Europe, are emerging from recessions and purchasing computers. However, the new wave of exports is small compared to the flood of imports coming into the U.S.

Reportedly, this year the U.S. trade surplus could decline from \$5 billion to \$2 billion. Last year the U.S. had positive trade balances with all parts of the world with the exception of the Far East, where that trade balance slipped to a negative \$2.5 billion. This figure could become much worse by year end. Much of the deficit is due to the growing reliance of U.S. computer manufacturers and customers on parts, assemblies and peripherals from Asian countries.

Computers for business, manufacturing and design continue to sell very well. However, there are signs that personal computer sales growth is slipping. Growth rates could drop to 15 pct by year end.

Very little seems able to derail the computer industry's runaway growth. Going into the second quarter of 1985, few signs point to a significant slowing of this growth.

INSTRUMENTS—Judging from the enthusiasm being generated by the introduction of computer-based systems for controlling processes and whole plants, it appears that the instrument and controls segment of the U.S. economy is strong and getting stronger.

Where industry analysts predicted a 3 pct annual growth of shipments, in constant dollars, some growth rates at the first months of 1985 are higher, between 6—7 pct.

Instruments and controls are used in industries that cover the broad spectrum of activities, services and products. Competitive forces are at play. Exports of instruments and controls have been slowed by the high value of the U.S. dollar. By the same token, imports of instruments and controls has increased, particularly during 1984, with Japan and Europe as the major suppliers, a trend that is seen as declining as the trend toward integrating computer technologies with instrumentation and sensor development increases.

The growing sophistication of programmable controllers, for example, has narrowed the gap between programmable controllers and numerical control to the point where major firms are restructuring by combining the previously separate engineering, manufacturing and marketing operations.

With the general economy of the U.S. reporting better-than-anticipated results during the opening months of the year, there seems to be little reason to question the enthusiasm of one leading supplier to the process control field that identified the 1985 automation market for manufacturing to be \$25 billion and projected that to grow to about \$100 billion in the next decade, for a compound annual growth rate of about 15 pct!

TUBULAR GOODS; MINING EQUIPMENT

TUBULAR GOODS—The upward trend in shipments of oil country tubular goods that became apparent late in 1984 is expected to ease somewhat in the second quarter of 1985. The excess inventory situation that plagued the industry most of last year is evaporating; however, the total footage of oil and gas wells drilled in the U.S. also has risen over last year and is a factor.

There is uncertainty over the price of crude oil and what impact lower prices will have on drilling activity. This is expected to continue through the second quarter.

"A test of oil prices should come in March or April," one industry official explained. "If the price holds at current levels or increases, we expect a much stronger second half. But if it drops, it could have a strong adverse effect on the industry."

Rig count drilling figures are running below 1984 levels, which is helping slow recovery in the OCTG industry. In part, the decline is seasonal and is expected to reverse by the end of the second quarter.

"But the uncertainty surrounding oil prices and the concern about the Administration's flat tax rate plan also is taking its toll," another industry official explained.

Despite the mixed news, domestic OCTG producers that have continuously lost market share should begin to see some benefit in the second quarter from agreed-upon quotas from offshore producers.

But it is unclear if this will compensate fully for decreased domestic drilling activities.

Some industry officials already have lowered projected average rig count figures eight to 10 pct below earlier projections. Further declines in projections can be expected if oil prices drop further. All of this activity combines to present an uncertain second quarter for OCTG producers.

MINING EQUIPMENT—Mining equipment makers reported a small but gratifying increase in activity in one market and "more of the same" in another market.

The "gratifying increase" comes from the coal mining industry. The "more of the same" is the iron ore industry, which is still in the throes of its worst and longest lasting slump in 50 years.

Mining equipment makers have reported practically no activity at all in iron mining machinery for the past three years and the first quarter of 1985. And they expect nothing but "more of the same" for the foreseeable future.

In fact, even a major resurgence in domestic steel activity would not remedy the situation, analysts noted. First, ore capacity is already more than adequate for meeting a 100 pct capacity level in presently existing domestic steel plants. Second, new, high-grade and "inexpensive" ore from Brazil threatens to enter the Midwest "any time a steel company cares to contract for it," as one industry observer said.

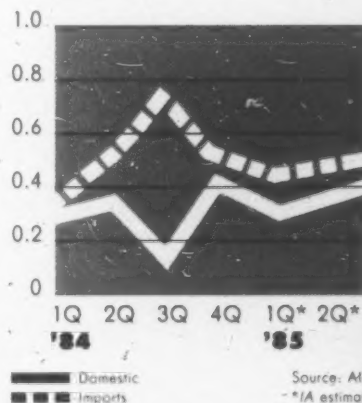
Coal mining companies, however, have reported some signs implying a steady upward trend in coal usage. "That, of course, translates into good business news for us," noted one coal processing equipment manufacturer. "We expect the second quarter of this year to be a good 20 pct better for us than last year's and the year itself perhaps better than 1984 by an even higher percentage. That's coming out of a very low period though," he added.

Simply put, the economy's general improvement has coal mining equipment producers more optimistic than they've been in the past few years. A further source of optimism comes from the major utilities. None of them is planning any major new nuclear plants.

Domestic OCTG producers... should begin to see some benefit the quotas.

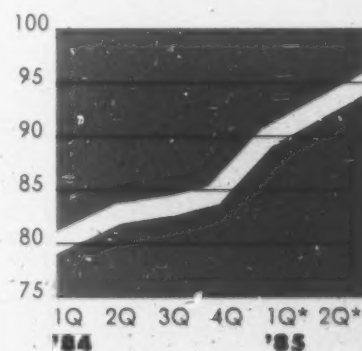
Tubular Goods Shipments

In Millions of Net Tons



Mining Equipment Sales

In Millions of Dollars



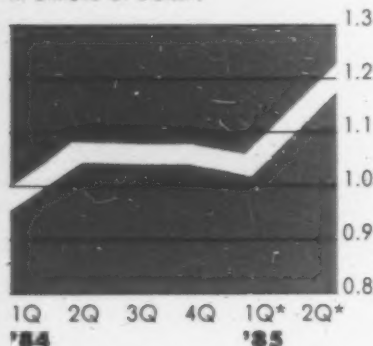
Total U.S. and export figures; includes continuous miners, mobile loading machines, shuttle cars and cutting machines. Source: Mining equipment manufacturers
*IA estimate

CONSTRUCTION; FARM EQUIPMENT

Traditionally, the second quarter is the strongest of the construction machinery year, but this year it will be poor.

Construction Equipment Shipments

In Billions of Dollars

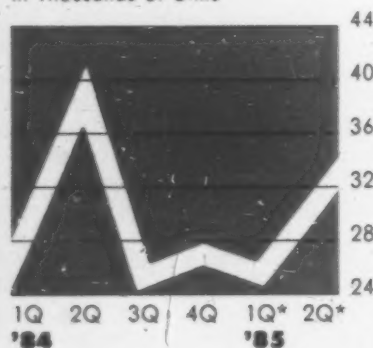


Source: U.S. Department of Commerce

*1A estimate

Farm Equipment Wheeling Tractor Sales

In Thousands of Units



Source: Farm & Industrial Equipment Institute

*1A estimate

CONSTRUCTION—Despite very conservative forecasts from construction machinery builders for 1985, *Iron Age* estimates that second quarter construction machinery unit sales could go up over 15 pct over the first quarter. U.S. producers have been predicting only about a 10 pct gain.

Strong retail sales have helped reduce field inventories and some dealers began adding inventory in the first quarter of 1985.

Traditionally, the second quarter is the strongest quarter of the construction machinery year from the standpoint of producer shipments, as dealers build for their biggest shipment season in the second and third quarters. The fourth quarter slows again seasonally, though it can be helped by tax-related sales at the end of the quarter.

Second quarter real volume will hinge on two critical factors. First is the impact of imports. In its annual forecast, *Iron Age* reported that foreign producers have forecast some strong gains for 1985.

Second is the nation's highway construction program. Without additional funding, the highway program could falter as early as second quarter. Highway spending was a strong factor in the beginning of the 1984 recovery, when construction equipment shipments advanced about 30 pct. Part of the 1984 money is still tied up and if these carry-over funds are authorized for expenditure that would help 1985 shipments, possibly by \$1.5 billion dollars, according to one estimate.

The rise in equipment builder orders to their component suppliers has matched gains in sales of equipment reported by some builders in mid-January. Combine that with lower dealer field inventories and prospects for the second quarter begin to look brighter.

FARM EQUIPMENT—Farm equipment continues to show one of the weaker 1985 performances in the capital goods sectors. First quarter sales of tractors, the industry's bellwether, were under the year ago figure and off in December from the previous month. December sales are helped by tax buying and this historically has lifted that month over the preceding month.

A mild flurry of components buying by some companies in January stirred hopes that farm equipment might make a belated pickup, but it now appears this was more related to the construction machinery or light industrial equipment lines of these companies. At the same time, comment by Deere & Co., the biggest U.S. farm machine builder, that it would cut 1985 production levels about 5 pct, exploded any hopes of a significant recovery during 1985.

The second quarter is seasonally a gainer, but after the lackluster first quarter, even the second quarter likely will be a poor performer.

Combines, the other big ticket item after tractors, are equally in trouble. Sales are reported to be off 31 pct from January 1984, but some pull-behind equipment seems to be in relatively better shape. In late 1984, *Iron Age* noted that "Short line" builders of farm machinery were faring better than the big machinery makers. Still, a survey of 400 members of the Farm Equipment Manufacturers Association showed that they were operating at only 50 pct of capacity.

At the moment, there is no reason to expect any change in these negative signs although there should be a moderate seasonal gain in second quarter sales by distributors. It probably won't translate into an equivalent gain in the manufacturing rate at the equipment makers' plants.

APPLIANCES; MATERIAL HANDLING

APPLIANCES—The major appliance industry outlook continues to be positive for the immediate future, but not across the board for all major appliances. The number of housing starts, which were the highest in five years during 1984 at 1.74 million housing units, will slightly trail behind during 1985 despite lower interest rates.

According to industry figures, 1984 U.S. shipments of major home appliances exceeded 39.4 million units, which surpassed the record 35.8 million units set in 1973.

The U.S. continues to be the world's largest single national market for appliances, with shipments at record levels. Some predictions for 1985 indicate that U.S. shipments may reach 39.8 million units, the result of a strong impetus from home modernization programs.

Microwave ovens proved to be the popular appliance, with more than one-fifth of the total 1984 shipments. More than eight million microwave ovens were sold, surpassing the unit sales number for gas and electric cookers for the first time.

The world microwave oven market in 1984 was an estimated 12.5 million units, up 36 pct over 1983. And, the world market is far from being saturated.

Total sales of all microwave ovens in Western Europe in 1984 were 1.6 million units, up 60 pct from the 950,000 units sold in 1983. While most of the microwave ovens sold in Europe were imported, production is expected to increase sharply as international companies step up production capacity and add more manufacturing plants to serve the Great Britain, West Germany, France and other European markets.

The second most-popular appliance sold in the U.S. during 1984 was the food disposer, with a record four million units sold.

MATERIAL HANDLING—Material handling equipment manufacturers are more optimistic than most other manufacturers these days simply because, so far, the "Asian Invasion" hasn't found them, industry analysts pointed out.

"We are seeing a significant increase in inquiries and a significant increase in orders over just a few weeks ago," reported one crane manufacturer. "People are getting their confidence back about the future," he added.

All segments of the material handling business noted increases in both orders and inquiries, from industrial trucks to AS/R systems. The industrial trucks segment, however, has "restructured" due to competition from Western Pacific nations. A large share of those bought by U.S. manufacturers from now on will be from Japan and Korea.

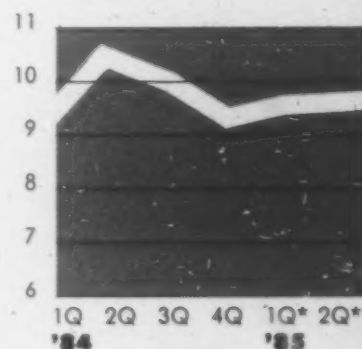
Other segments of the material handling industry, particularly large warehousing stacker crane systems, seem destined to remain domestically produced. This is because of the "custom" nature of such systems.

"We expect the year to be our best in several," noted one systems company president. "The first quarter is already turning out to be our best in years and I think, barring a major disaster like a return to high inflation, we'll rack up a terrific 1985. In fact, I really believe we're entering a long period, perhaps the rest of the decade, of steady and good growth," he said.

Others in the industry reported similar great expectations. "What we offer now is so much more effective and faster than what it is designed to replace, that the market will just have to buy it," said one systems company executive. "We expect the awareness of that fact to spread in the market throughout the year," he predicted.

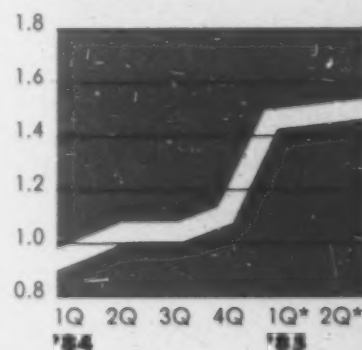
The appliance industry outlook remains positive for the immediate future.

Appliances, Shipments
In Millions of Units



Source: Assn. of Home Appliance Manufacturers
*1A estimate

Material Handling Shipments
In Billions of Dollars



Source: Material Handling Institute
*1A estimate

CASTINGS; FORGINGS

CASTING—The foundry industry was expected to gain only about 2 pct in total 1985 shipments, pegged largely on a good movement of castings to the auto and appliance industries, and hampered by slow demand from its customers in the farm machinery and construction machinery markets.

Second quarter should be the strongest quarter of this year, and looks like it will be up. But on the basis of reports up to this point, the projected 2 pct gain may be overly hopeful. Even first quarter is not showing the gain over the year ago that it should be to bring the year in ahead of 1984.

The year began mixed. Where some auto suppliers were running almost full out, foundries with a strong capital goods customer list were often running at only 50 pct of capacity.

The positive sign in the capital goods group was that the backlogs of orders were inching up a little through February.

That still leaves the ferrous foundry group pinched between a fairly low scrap supply, and customer demand for very short delivery times on castings. Pressure is also increased on delivery times by the heavy demand for auto parts and six cylinder engines, where several auto products are delayed on delivery by engine needs.

All these conflicting trends have made forecasting difficult for foundry managers. Some were running up to 10 pct ahead of the fourth quarter of 1984, in first quarter of 1985. These were strongly oriented to customer goods-related castings, like auto and appliance. But others were running 5 pct under fourth quarter (which, incidentally, was probably the lowest quarter of 1984) in a period when the industry traditionally has rebounded by an average 7 pct.

FORGINGS—For the first few months of 1985, business for forging companies is up, but profits remain in the dumps. "Profitability stinks," is how one official put it.

New orders in January rose to a modest \$193 million, the highest level in the six months. However, because of an excess of competition, both foreign and domestic, few firms are making much money. Imported forgings (raw forgings and as parts of finished products) are taking a bigger share of the U.S. market.

"The only firms that are doing reasonably well are the larger companies," continued the official. "The smaller firms are still having a hell of a time trying to make some money."

Because companies are having trouble making ends meet, a number of them are up for sale and several people commented that the next few years could see a rash of consolidations and plant closings.

As long as U.S. auto manufacturers remain healthy, the forging industry at least is assured of some business. However, beyond producing forgings for trucks and cars, there is precious little business to be had. Several companies have noted that new military orders are trickling in. These orders reportedly are coming from all three branches of the service.

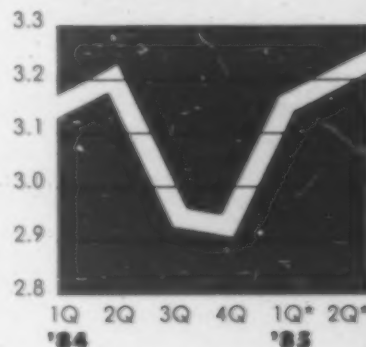
Most major markets for forgings, off-highway, farm equipment industries, aerospace, and oil field goods industries remain depressed.

The growth of the economy in 1985 has been better than expected for the first quarter and business will get even better in the second. A strong economy should mean improved sales of forgings in the second quarter. However, more than just a general economic pickup is needed to inject some real life into the forging industry.

The second quarter should be the strongest quarter for castings, but the expected gain is only 2 pct, for the year!

Ferrous Castings Shipments

in Millions of Tons

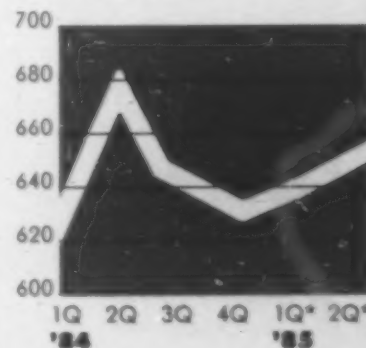


Source: U.S. Department of Commerce

*1A estimate

Impression Die Forgings Shipments

In Billions of Dollars



Source: U.S. Department of Commerce

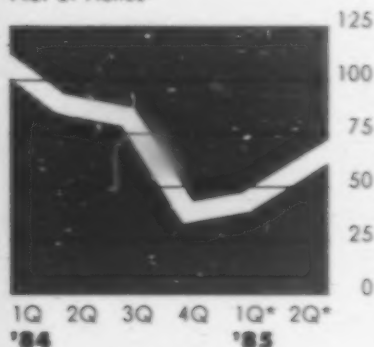
*1A estimate

AIRCRAFT; ENGINES & TURBINES

Orders for new aircraft took off slowly in 1984 and are continuing their climb into the second quarter of 1985.

Commercial Airplane Orders

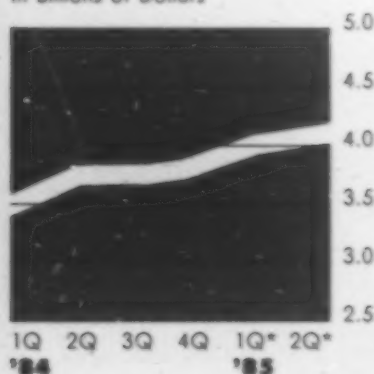
No. of Planes



Source: Airbus Industrie, Boeing and McDonnell-Douglas
*IA estimate

Engines and Turbines Shipments

In Billions of Dollars



Source: U.S. Department of Commerce
*IA estimate

AIRCRAFT—The aircraft industry appears to be on a firm footing after several quarters of uncertainty. Airline traffic has grown steadily as a result of last year's U.S. economic recovery. Along with a more stable fare structure, reduced fuel prices and lessening labor costs for many major domestic airlines, profitability is being restored.

In the second quarter, it is expected that there will be continued price pressure on the major airframe manufacturers, as well as the continuation of complex financing arrangements and the acceptance of older, used aircraft as trade-ins.

However, most officials believe the upward trend evident throughout last year and into the beginning of 1985 will continue into the second quarter. Many small orders for new aircraft are being received.

Expectations are that the world airline industry will earn some \$800 million this year, which could set the stage for major purchases for replacement aircraft.

Indications are that at least three major aircraft deals with foreign airlines are in the works, which could lead to near-term orders of at least 50 new airplanes. It is unclear, however, when the actual firm orders will be placed. Although it appears aircraft sales in the first half of 1985 will run slightly below the same period last year, the finalization of these anticipated new orders could provide a major boost to the industry later this year.

Officials are optimistic that many airlines need advanced technology airplanes to meet traffic growth requirements and as replacements. Such a level of optimism has not been voiced for several years. However, with airline profitability returning and fuel prices stabilized or dropping, such positive expectations appear well-founded.

ENGINES & TURBINES—The strong, sustained economic recovery is beginning to exert its influence in this broad industry as some segments begin to show stronger improvement in the second quarter.

The trend has been toward a gradual but constant improvement in the industry as a whole for several quarters. This trend may accelerate slightly in the second quarter. The automotive segment is gaining strength. Further improvement also has been noted in the construction area, thanks to sliding interest rates and the general feeling that the recovery will be sustained.

With interest rates likely to remain low for most of the second quarter, both of these industry segments should benefit.

The diesel engine segment also has shown indications of a revival, with industry officials voicing optimism if the recovery in the economy as a whole stays on track.

But the performance in this industry has remained mixed because of a number of negative factors that seem unlikely to turn around in the short term. Expensive purchases of power plants and large diesels has been forestalled and likely will stay depressed in the second quarter as many companies hold back expensive capital improvement purchases. Uncertainty about oil prices has caused the oil segment to remain sluggish.

There still is an overcapacity of electrical power in the consumer market that has caused a long-standing backlog in the utility area. The domestic nuclear energy industry remains troubled.

Most industry officials hail the recovery. While it has pulled up limited segments of this industry, its impact has yet to be felt in the longer range, more expensive segments of the engine and turbine trade.

WELDING; HEAT TREATMENT

WELDING—Despite the fact that some of welding's favorite markets have either dried up or gone overseas, the metals joining industry is doing very well. The first quarter of 1985 has been a slight improvement over a strong fourth quarter of 1984 as well as a healthy 10 pct jump over the first quarter of 1984. The second quarter appears to be better still.

According to distributor sales data available from the National Welding Supply Association, Philadelphia, January 1985 was the second best month in the more than five years that the organization has been reporting data. The January index was 193.9. Only October 1984, with an index of 196.6, was higher.

Picking up the slack created by markets gone bad or gone overseas is automotive. This is where mechanized welding has gotten a real push. As noted in the last welding forecast, mechanized welding has finally passed manual welding in use.

The welding industry is also beginning to feel the effect of the huge national bridge-building effort. Processes likely to benefit from this new thrust are flux-cored and submerged-arc welding. Also, the "vertical-up" methods like electroslag and electrogas welding are expected to gain some footholds as well.

Other healthy application areas for welding include Navy ship construction and various other defense areas. The bridge and Navy areas should be strong throughout the balance of the year. Automotive, of course, is something else. It could weaken, depending on the future of imports.

The sale of robots is beginning to improve, but it is still no match for the welding robot activity in Japan or even in West Germany, for that matter. Dedicated automation is showing greater signs of growth.

HEAT TREATING—In what one industrial heating equipment manufacturer called "A nervous market," industrial heat treaters and suppliers of industrial furnace equipment appear to be outperforming many of the markets they supply.

Iron Age expected industrial heating equipment to advance another 6 pct over fourth quarter 1984 during first quarter 1985, and to follow that performance with another moderate gain of 6 pct in second quarter 1985 over first quarter.

Heat treaters themselves, the industrial service group that supply commercial heat treating services to a wide range of customer industries, should do even better. They appear to be running up about 14 pct, in first quarter over their good gains in the closing quarter of 1984. In second quarter, industry sources believe they can still come up another 6 pct over their first quarter gains.

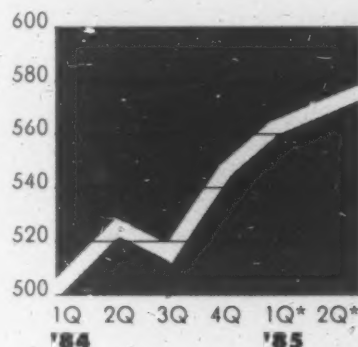
This means that heat treaters are running about 14 pct over last year, when their industry scored a remarkable recovery from the lows it hit in 1983. Some knowledgeable industry sources call the 14 pct gain "a little optimistic."

Industrial heating equipment customers were slow to break orders loose, and even faltered badly in third quarter of 1984. But when they came back into the market they began pressing suppliers with very short delivery times. This has put pressure on heating equipment producers who find that their own materials and components suppliers are in a short inventory situation and find it difficult to meet very fast delivery requirements.

Despite this, one source points out, there does not seem to be an increase in buying equipment manufactured off-shore to reflect the delivery pressure among domestic customers.

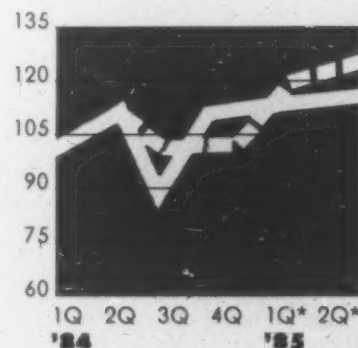
After a strong fourth quarter, welding continues upbeat for the second quarter, about 10 pct better than a year ago.

Welding Shipments



Index: 100 = \$200 million in distributor sales
Source: National Welding Supply Assn.
*1A estimate

Heat Treatment
In Millions of Dollars

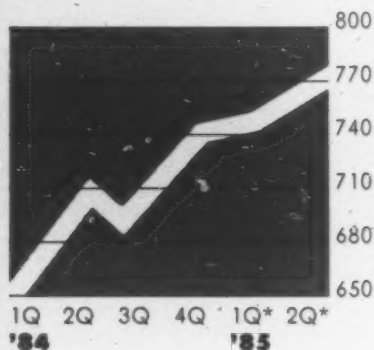


— Sales of Commercial Heat Treaters
- - - Heat Processing Equipment Orders
Source: Industrial Heating Equipment Assn., Metal Treating Institute
*1A estimate

FASTENERS; GEARS

Market by market, the (fastener) industry's hopes for the rest of 1985 vary.

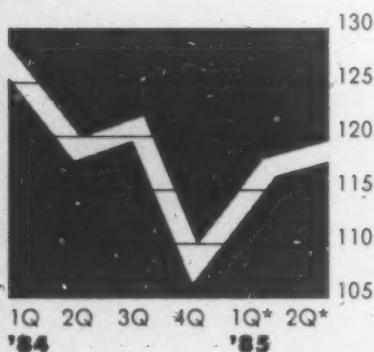
Fasteners, Sales
In Millions of Dollars



Source: Industrial Fasteners Institute

*1A estimate

Gears Bookings



Based on average monthly bookings, 1977=100

Source: American Gear Manufacturers Assn.

*1A estimate

FASTENERS—The first quarter of 1985 was another disaster for those remaining "standards" producers in the domestic mechanical fastener industry. Imports are claiming "overwhelming market share" in standard nuts and bolts, said one analyst of the industry.

Numbers about 1984 were bad enough, he added. For example, 1984's figures for imports were 52 pct higher than 1983. The total for 1984 nudged near 1.5 billion lbs valued at around \$850 million in sales lost to domestic producers. According to industry sources, that trend has not abated and is threatening to wash out what's left of U.S. standard nut and bolt companies.

The other end of the fastener industry, the "specials" producers, however, reported a remarkably good first quarter and expect the second quarter of 1985, and the year to be better than any since the late 1970's. The second quarter could show an increase in sales of "at least 15 pct over the first quarter and up perhaps 30 pct or more over the second quarter of 1984," predicted one industry leader.

Market by market, the industry's hopes for the rest of 1985 vary.

"After the Japanese are through with the American car makers, I wonder where we'll set up shop. Almost all our product goes to auto companies and if they really do go overseas, I guess we'll just close," said one company executive.

Others who depend on the auto industry agree that the Reagan Administration's decision does not bode well for fastener makers.

The aerospace market, on the other hand, still looks strong for fastener makers as does the appliance industry. "Appliances are much more replaceable these days due to new technologies," said one fastener maker.

GEARS—Some gear industry executives see 4 to 5 pct greater output in their industry in the second quarter, but more-optimistic members see orders up 8 pct, spurred by "a lot of activity in the military."

The last quarter of 1984 was a major disappointment. The American Gear Manufacturers Assn. showed bookings at \$71.1 million in November compared to \$83.9 million a month earlier, and they slid further in December—to \$70.9 million. Now, gearmakers think product sales in almost every category are rebounding.

Order backlogs are improving. One Midwestern supplier said his position is not only improved over last year, but he is looking for his second-quarter backlog to rise as much as 20 pct compared with the second quarter of 1984.

Another noted that the only weak link is fine pitch gears.

The market for gears is mixed. "The auto and paper industries are keeping us going," said one gearmaker. His markets in primary metals, mining and cement are still in the doldrums, he added.

But another Midwestern gear executive told *Iron Age* that, in addition to some big orders from bridge builders and transportation equipment manufacturers, he is expecting 20 to 25 pct more business from the cement industry this quarter.

The gear industry also seems to be benefiting from a pickup in the spare parts business.

Nobody was upbeat about farm equipment firms, which may be in the cellar for two years or more.

Meanwhile, gearmakers are still plagued by the strength of the dollar and its effects on imports.

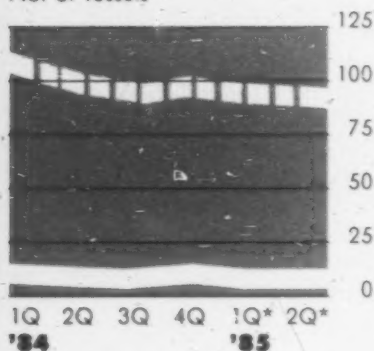
And yet one official noted he's seeing more quotations for gears for export to sugar mills.

And that's a mystery in his book.

SHIPBUILDING; RAILCARS

The commercial figure is expected to hold up through the second quarter, while the Navy activity will drop.

Shipbuilding
No. of vessels

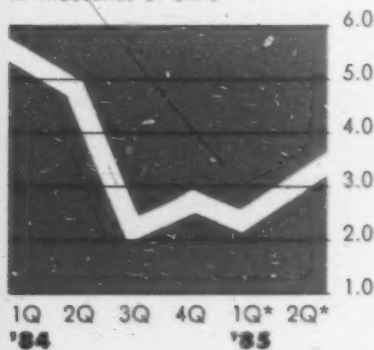


■ Commercial, 1,000 gross tons or over
■ Naval, 1,000 light displacement tons

Source: Shipbuilders Council of America

*IA estimate

Rail Car Orders
In Thousands of Units



Source: American Railway Car Institute

*IA estimate

SHIPBUILDING—Thanks to U.S. Navy construction, the shipbuilding industry is in fair shape at the end of the first quarter. There are seven commercial ships and 97 Navy vessels under contract in U.S. yards. The commercial figure is expected to hold up through the second quarter, while the Navy activity will drop to about 94 vessels.

Is the offshore rig construction market showing any signs of life? Barely. The world market is showing more life with 50 rigs under construction. That is up from an all-time low of 34 rigs several months ago. In the U.S., however, shipyards are only building three rigs and it does not look as if this level of activity will improve through the balance of the year.

Commercial shipbuilding will get through this year with at least five ships under contract, but perhaps no more. The core of the commercial shipbuilding program are two large crude oil carriers and three container ships. In addition, it has been reported that five companies are developing plans to enter the expanding cruise ship market.

The Navy situation is another matter. A contract is still to be let for one final Trident submarine. Here we are talking about a \$1.7 billion contract, the Navy's biggest. Twelve other Navy ships are in the same kind of situation.

Looking further down the pike, there is a possibility that contracts will be let for 23 new Navy vessels during the fourth quarter, but that is no certainty.

Tonnage-wise, shipbuilding is off six vessels from the fourth quarter of 1984 and down 12 vessels from the first quarter of last year. Activity will be off by another three ships in the second quarter. However, Navy appropriations are up \$2 billion from last year's \$11 billion figure.

RAIL CARS—Orders for new rail cars are off to a bad start in 1985. But there is still hope that this year will eclipse the so-so 12,400-car order year of 1984.

According to IA estimates, the industry is off by about 14 pct from the fourth quarter of 1984 and by more than 50 pct from last year's first quarter. The industry, however, is expected to recoup this apparent loss before the year is out.

The big problem in rail cars is that a huge surplus of 143,000 cars is sitting around idle. With that kind of backlog, who needs any new rail cars? The demand is there for specialized tank cars, most of which will be leased. But that's about the extent of the activity. Even the railroads themselves are hardly buying anything. "They only bought 1,100 cars during 1984," one industry observer noted.

There is nothing new happening to increase the demand for coal cars, the number one type of rail car. Besides, there are 43,000 coal cars among the surplus.

The dismal first quarter should be followed by a reasonably decent second quarter. Some optimistic prognosticators are counting on a 25,000 rail car year in 1985. Others say it will be slightly worse than 1984. From the early evidence, it would appear that the pessimists are more on target at this point in time.

The lease market, according to one observer, has been the only component holding the industry together since the booming years of 1981 and before when annual orders ran between 75,000 and 100,000 cars. "But now even the lease market is showing signs of drying up," he said.

According to the U.S. Department of Commerce, the rail car fabricating industry is currently operating at less than 20 pct of capacity.

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective March 11, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	195	192	163	232
Pittsburgh	246	206	198	294
Youngstown	118	110	101	122
Lake Erie	168	159	151	129
Detroit	143	144	134	162
Chicago	471	442	456	580
Cincinnati	104	98	87	105
St. Louis	73	78	71	82
Southern	219	203	173	232
Western	102	95	85	83
U.S. Production	1,839	1,727	1,619	2,032

Source: American Iron & Steel Institute

Lake Superior Ore Prices

\$1.50% Fe Natural delivered lower lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80 50¢—Pickands Mather as of 1/27/81.

86.9¢—U.S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82. and Hanna Mining as of 2/26/82.

**Effective 8/1/83.

NONFERROUS PRICES

(Effective March 11, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	49.67	49.20	3/11/85
Copper (C)	64.00- 65.00	63.50- 65.00	3/4/85
Lead	17.00- 21.00	18.00- 21.00	3/6/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	232.65	230.58	3/11/85
Titanium Sponge	553.00- 585.00	555.00	4/29/82
Zinc	45.00	43.00- 45.00	2/25/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.25-1.55
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$291.00
Indium, dollars per troy oz.	\$2.80-3.10
Iridium, dollars per troy oz.	\$475.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$310.00-319.00
Molybdenum, lb. tech. moly oxides, 20 lb. MC can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective March 11, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,839	1,727	16,011	18,316
Capability Utilization Rate	71.0	66.7	63.7	72.2

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base*				
(¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	26.939
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$86.83	\$86.50	\$82.50	\$91.50
No. 2 bundles	\$57.50	\$57.50	\$54.83	\$62.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$92.50	\$92.50	\$86.50	\$100.50
No. 1 steel, Philadelphia	82.50	81.50	80.50	86.50
No. 1 steel, Chicago	85.50	85.50	80.50	87.50
No. 1 bundles, Detroit	87.50	87.50	75.50	95.50
Low Phos., Youngstown	72.50	72.50	72.50	99.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	100.50
No. 1 mach'y cast., Chi	111.50	111.50	111.50	111.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing plants within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$113.00
Platinum, per troy oz.	\$253.00
Rhodium, per troy oz.	\$1,150.00
Silver ingots, per troy oz.	\$5.66
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

March 4—509.99	March 7—508.40
March 5—509.19	March 8—508.80
March 6—508.80	

Scrap Prices Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	61 1/2	52 1/4
Yellow brass	55	50 1/2
Red brass	57 3/8	51
Comm. bronze	58 3/8	51 3/4
Mang. bronze	57 1/8	47
Free cutting rod ends	51	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	46
Light copper	37

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	51
No. 2 copper wire	42
Light copper	33
No. 1 composition	47
No. 1 comp. turnings	44
Hvy. yellow brass solids	34
Hvy. yellow brass turnings	32
Radiators	37

Aluminum		
New mixed clips	36	—37
Old sheet	34	—35
Old cast	34	—35
Clean dry borings	34	—35

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	29	—30
Mixed L.C. clips	27	—28
Old sheets and cast	24	—26
Borings and turnings	22	—23
Duraluminum clippings	25	—26

Copper and Brass

No. 1 copper wire	45	—46
No. 2 copper wire	37	—38
Light copper	32	—33
Radiators	32	—33
No. 1 composition	40	—41
No. 1 composition turnings	37	—38
Cocks and faucets	30	—32
Clean heavy yellow brass	28	—29
Brass Pipe	28	—29
New soft brass clippings	41	—42

Lead

Heavy soft lead	9	—10
Whole batteries	1	—3
Type metal	16	—17
Electrotype	13	—14

Nickel

Nickel solids	120	—130
Nickel rod ends	120	—130
Nickel sheets, clips	120	—130
Nickel turnings	40	—45

Zinc

New zinc clippings	18	—19
Old diecast zinc	14	—15

EFFECTIVE MARCH 11, 1985

(Effective March 11, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 92.00 to	\$ 93.00
No. 2 hvy. melting	82.00 to	83.00
No. 1 dealer bundles	107.00 to	108.00
No. 1 factory bundles (auto)	111.00 to	112.00
No. 2 bundles	56.00 to	57.00
No. 1 busheling	109.00 to	110.00
Machine shop turnings	10.00 to	11.00
Shoveling turnings	51.00 to	52.00
Cast iron borings	49.00 to	50.00
Low phos. punchings plate	111.00 to	112.00
Heavy turnings	82.00 to	83.00
No. 1 RR hvy. melting	97.00 to	98.00
Rails, 2 ft. and under	113.00 to	114.00
Scrap rails, random lgth	104.00 to	105.00
RR specialties	107.00 to	108.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	64.00 to	65.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	610.00 to	615.00
18-8 turnings	510.00 to	515.00

Chicago

No. 1 hvy. melting	\$ 85.00 to	\$ 86.00
No. 2 hvy. melting	81.00 to	82.00
No. 1 dealer bundles	102.00 to	103.00
No. 1 factory bundles (auto)	104.00 to	105.00
No. 2 dealer bundles	64.00 to	65.00
No. 1 busheling	100.00 to	101.00
Shredder scrap	99.00 to	100.00
Machine shop turnings	51.00 to	52.00
Mixed borings and turnings	52.00 to	53.00
Shoveling turnings	53.00 to	54.00
Cast iron borings	50.00 to	51.00
Low phos. large clip	118.00 to	119.00
1/4 in. and heavier	132.00 to	133.00
Low phos. 2 ft. and under	126.00 to	127.00
No. 1 RR hvy. melting	95.00 to	96.00
Scrap rails random lgth	95.00 to	96.00
Roller rails	109.00 to	110.00
Rails, 2 ft. and under	120.00 to	121.00
RR couplers and knuckles	104.00 to	105.00
RR car axles	126.00 to	127.00
No. 1 machinery cast	111.00 to	112.00
Cupola cast	102.00 to	103.00
Stove plate	99.00 to	100.00
Steel car wheels	109.00 to	110.00
Stainless		
18-8 bundles and solids	550.00 to	560.00
18-8 turnings	470.00 to	480.00
430 bundles and solids	135.00 to	140.00
430 turnings	105.00 to	110.00

Philadelphia

No. 1 hvy. melting	\$ 81.00 to	\$ 84.00
No. 2 hvy. melting	71.00 to	74.00
No. 1 dealer bundles	94.00 to	97.00
No. 2 dealer bundles	50.00 to	53.00
No. 1 busheling	92.00 to	95.00
Shredder scrap	100.00 to	103.00
Machine shop turnings	26.00 to	29.00
Mixed borings and turnings	26.00 to	29.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	92.00 to	95.00
Low phos. 2 ft. punchings	110.00 to	113.00
Electric furnace bundles	113.00 to	116.00
RR specialties	92.00 to	95.00
Rails, 2 ft. and under	112.00 to	115.00
Cupola cast	82.00 to	85.00
Heavy breakable cast	57.00 to	60.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 64.00 to	\$ 65.00
No. 2 hvy. melting	43.00 to	44.00
No. 1 dealer bundles	87.00 to	88.00
No. 2 bundles	39.00 to	40.00
No. 1 busheling	86.00 to	87.00
Drop forge flashings	55.00 to	56.00
Machine shop turnings	54.00 to	55.00
Mixed borings and turnings	28.00 to	29.00
Shoveling turnings	55.00 to	56.00
Cast iron borings	34.00 to	35.00
Heavy breakable cast	42.00 to	43.00
Mixed cupola cast	58.00 to	59.00
Automobile cast	82.00 to	83.00
Stainless		
18-8 bundles and solids	475.00 to	485.00
18-8 turnings	380.00 to	390.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	\$ 69.00 to	\$ 72.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	81.00 to	84.00
No. 2 dealer bundles	35.00 to	38.00
Machine shop turnings	11.60 to	14.00
Shoveling turnings	18.00 to	19.00
Low phos. plate	71.00 to	74.00
Electric furnace bundles	69.00 to	72.00
Galvanized bundles	59.00 to	62.00

Cleveland

No. 1 hvy. melting	\$ 70.00 to	\$ 73.00
No. 2 hvy. melting	42.00 to	45.00
No. 1 dealer bundles	84.00 to	87.00
No. 1 factory bundles	92.00 to	95.00
No. 2 bundles	35.00 to	38.00
No. 1 busheling	87.00 to	90.00
Machine shop turnings	12.00 to	15.00
Mixed borings and turnings	6.00 to	9.00
Shoveling turnings	13.00 to	6.00
Cast iron borings	14.00 to	17.00
Cut structural & plates,		
2 ft. and under	118.00 to	121.00
Low phos. punchings plate	118.00 to	121.00
Drop large flashings	50.00 to	53.00
Foundry steel, 2 ft. & under	74.00 to	77.00
No. 1 RR hvy. melting	84.00 to	87.00
Rails, 2 ft. and under	117.00 to	120.00
Rails, 18 in. and under	119.00 to	122.00
Steel axle turnings	64.00 to	67.00
Railroad cast	95.00 to	98.00
No. 1 machinery cast	105.00 to	108.00
Cupola cast	61.00 to	64.00
Stove plate	60.00 to	63.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	325.00 to	335.00
430 bundles	80.00 to	85.00

Buffalo

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 69.00 to	\$ 70.00
No. 2 hvy. melting	57.00 to	58.00
No. 1 busheling	84.00 to	85.00
No. 1 dealer bundles	83.00 to	84.00
No. 2 bundles	43.00 to	44.00
Machine shop turnings	17.00 to	18.00
Mixed boring and turnings	18.00 to	19.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	28.00 to	29.00
Low phos. plate	97.00 to	98.00
Structural and plate,		
2 ft. and under	100.00 to	101.00
Rails, 2 ft. and under	100.00 to	101.00
Scrap rails, random lgth	74.00 to	75.00
No. 1 machinery cast	80.00 to	81.00
No. 1 cupola cast	60.00 to	61.00

St. Louis

No. 1 hvy. melting	\$ 69.00 to	\$ 70.00
No. 2 hvy. melting	56.00 to	57.00
Foundry steel, 2 ft.	44.00 to	45.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	51.00 to	52.00
Machine shop turnings	19.00 to	20.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	29.00 to	30.00
No. 1 RR hvy. melting	69.00 to	70.00
Rails, random length	68.00 to	69.00
Rails, 18 in. and under	84.00 to	85.00
RR specialties	83.00 to	84.00
Cupola cast	76.00 to	77.00
Heavy breakable cast	54.00 to	55.00
Stove plate	91.00 to	92.00
Steel car wheels	100.00 to	101.00
Rolling rails	80.00 to	81.00
Unstripped motor blocks	63.00 to	64.00

Birmingham

No. 1 hvy. melting	\$ 73.00 to	\$ 74.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	77.00 to	78.00
No. 2 bundles	55.00 to	56.00
No. 1 busheling	77.00 to	78.00
Shredder scrap	99.00 to	100.00
Machine shop turnings	29.00 to	30.00
Shoveling turnings	42.00 to	43.00
Cast iron borings	39.00 to	40.00
Electric furnace bundles	74.00 to	75.00
Elec. furnace, 3 ft. & under	74.00 to	75.00
Structural and plate, 2 ft.	100.00 to	101.00
Structural and plate, 4 ft.	92.00 to	93.00
No. 1 RR hvy. melting	92.00 to	93.00
Scrap rails, random lgth	90.00 to	91.00
Rails, 2 ft. and under	105.00 to	106.00
Angles and splice bars	92.00 to	93.00
No. 1 cupola cast	87.00 to	88.00
Unstripped motor blocks	75.00 to	76.00

Cincinnati

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 56.00 to	\$ 57.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 dealer bundles	68.00 to	69.00
No. 2 bundles	28.00 to	29.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	9.00 to	10.00
Cast iron borings	21.00 to	22.00
Low phos. 18 in. and under	87.00 to	88.00
Rails, random length	65.00 to	66.00
Rails, 2 ft. and under	81.00 to	82.00
No. 1 cupola cast	61.00 to	62.00
Heavy breakable cast	26.00 to	27.00
Drop broken cast	77.00 to	78.00

New York

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 47.00 to	\$ 48.00
No. 2 hvy. melting	38.00 to	39.00
No. 2 dealer bundles	23.00 to	27.00
Mixed borings and turnings	11.00 to	13.00
Machine shop turnings	6.00 to	7.00
Shoveling turnings	14.00 to	15.00
Clean cast chem. borings	35.00 to	36.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	505.00 to	525.00
18-8 turnings	405.00 to	425.00
430 prepared solids	90.00 to	110.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 58.00 to	\$ 60.00
No. 2 hvy. melting	48.00 to	50.00
No. 1 dealer bundles	61.00 to	63.00
No. 2 bundles	35.00 to	37.00
No. 1 busheling	70.00 to	72.00
Shredder scrap	67.00 to	69.00
Machine shop turnings	10.00 to	12.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	81.00 to	86.00
Mixed cupola cast	48.00 to	50.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	\$ 44.00 to	\$ 46.00
No. 2 hvy. melting	38.00 to	40.00
No. 1 dealer bundles	35.00 to	37.00
No. 2 dealer bundles	20.00 to	22.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	81.00 to	83.00

Los Angeles

No. 1 hvy. melting	\$ 47.00 to	\$ 49.00
No. 2 hvy. melting	40.00 to	42.00
No. 1 dealer bundles	38.00 to	40.00
No. 2 dealer bundles	20.00 to	22.00
Machine shop turnings	13.00 to	14.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under	74.00 to	76.00
(foundry)	74.00 to	76.00
No. 1 cupola cast	75.00 to	77.00

Seattle

No. 1 hvy. melting	66.00 to	68.00
No. 2 hvy. melting	57.00 to	59.00
No. 2 bundles	40.00 to	42.00
No. 1 cupola cast	92.00 to	93.00
Mixed yard cast	82.00 to	84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 86.00 to	\$ 88.00
No. 2 hvy. melting, cut 2 ft. and under	78.00 to	80.00
No. 1 dealer bundles	84.00 to	86.00
No. 2 bundles	60.00 to	62.00
Mixed steel scrap	60.00 to	62.00
Bush. new fact. prop'd	86.00 to	88.00
Bush. new fact. unprop'd	75.00 to	77.00
Machine shop turnings	33.00 to	35.00
Short steel turnings	35.00 to	37.00
Mixed borings and turnings	25.00 to	27.00
Cast scrap	95.00 to	97.00

Houston

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 78.00 to	\$ 79.00
No. 2 hvy. melting	64.00 to	65.00
No. 2 bundles	49.00 to	50.00
Machine shop turnings	17.00 to	18.00
Crushed turnings	34.00 to	35.00
Shredder scrap	86.00 to	87.00
Cut structural plate, 2 ft. and under	105.00 to	106.00
Cut structural plate, 5 ft. and under	89.00 to	90.00
Unstripped motor blocks	60.00 to	61.00
Cupola cast	87.00 to	88.00

PRODUCER KEY
With Principal Offices

A7 Armco Inc., Middletown, Ohio	N4 Northwestern Steel & Wire Co., Sterling, Ill.	S16 Southern Precision Steel Co., Gulfport, Miss.
A8 Atlantic Steel Co., Atlanta, Ga.	N6 Northwest Steel Rolling Mills, Seattle	T4 Thomas Steel Strip Co., Warren, Ohio
A11 Atlantic Wire Co., Branford, Conn.	N9 Nelsen Steel & Wire Co., Chicago	T5 Timken Co., Steel Division, Canton, Ohio
B1 Baran Drawn Steel Corp., Toledo, Ohio	N10 North Star Steel Co., Saint Paul, Minn.	T7 Texas Steel Co., Fort Worth, Tex.
B3 Bethlehem Steel Corp., Bethlehem, Pa.	O2 Oregon Steel Mills, Portland, Ore.	T9 Triumph Electro Corp., Chicago
B4 Blair Strip Steel Co., New Castle, Pa.	P2 Phoenix Steel Corp., Claymont, Del.	T10 Tennessee Forging Steel Corp., Harriman, Tenn.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.	P15 Philadelphia Steel and Wire Corp., Phila.	T11 Teledyne Columbia-Summerill, Carnegie, Pa.
C6 CF&I Steel Corp., Pueblo, Colo.	R3 Republic Steel Corp., Cleveland	U1 United States Steel Corp., Pittsburgh
C10 Copperweld Steel Co., Warren, Ohio	R4 Ramco Steel Co., Buffalo, N. Y.	W3 Weirton Steel Corp., Weirton, W. Va.
C16 Connors Steel Co., Birmingham, Ala.	R5 Robin Steel Corp., North Tonawanda, N.Y.	W5 Wheeling-Pittsburgh Steel Corp.
C20 Calumet Steel Div., Chicago Heights, Ill.	R7 Rome Strip Steel Co., Rome, N. Y.	W7 Wilson Steel & Wire Co., Chicago
D1 Detroit Strip Div., Cyclops Corp.	S1 Sharon Steel Corp., Sharon, Pa.	W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh
E4 Elliot Bros. Steel Co., New Castle, Pa.	S7 Stanley Works, New Britain, Conn.	W14 Whittier Steel Strip Div., Whittier Industries, Ltd., Detroit
F1 Firth Sterling, Inc., McKeesport, Pa.	S8 Superior Drawn Steel Co., Monaca, Pa.	
G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.	S10 Seneca Steel Corp., Buffalo, N. Y.	
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.		
G4 Greer Steel Co., Dover, Ohio		
G5 Green River Steel Corp., Owensboro, Ky.		
G6 Gibraltar Steel Corp., Buffalo, N. Y.		
G7 Georgetown Steel Corp., Georgetown, S.C.		
H1 Hercules Drawn Steel Corp., Livonia, Mich.		
I2 Ingersoll Steel Div., Newcastle, Ind.		
I3 Inland Steel Co., Chicago		
I4 Interlake Steel Corp., Chicago		
J2 Jessop Steel Corp., Washington, Pa.		
J3 Jones & Laughlin Steel Corp., Pittsburgh		
J4 Joslyn Mfg. & Supply Co., Chicago		
J5 Judson Steel Corp., Emeryville, Calif.		
K2 Keystone Consolidated Industries, Inc.		
K3 Kentucky Electric Steel Co., Ashland, Ky.		
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.		
L2 La Salle Steel Co., Chicago		
L3 Lone Star Steel Co., Dallas		
L4 Lukens, Inc., Coatesville, Pa.		
M2 McLouth Steel Products Corp., Detroit		
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.		
M9 Moltrup Steel Products Co., Beaver Falls, Pa.		
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.		
N1 Northeast Precision Steel Co., Boston		

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

	Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (15 gage)				Hot-Rolled (merch)	Cold Finished	Hot-Rolled A513	Hot-Rolled A513	Cold-Drawn A513	Cold-Drawn A513
	City Delivery Charge*				Hot-Rolled Strip	Plates	Standard Structurals						
G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.	Atlanta	26.95	32.83	33.53	31.34	25.79	22.76	19.99	31.88	34.34	50.60	69.58	73.19
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.	Baltimore	26.90	30.72	35.71	36.82	32.66	28.80	22.60	36.40	51.69	56.95	63.60	69.98
G4 Greer Steel Co., Dover, Ohio	Birmingham	25.47	32.35	35.27	31.94	25.40	23.63	21.20	32.24	49.31	58.90	68.10	74.43
G5 Green River Steel Corp., Owensboro, Ky.	Boston	34.94	40.19	45.64	47.54	33.25	30.06	23.88	35.93	41.98	46.00	54.65	58.83
G6 Gibraltar Steel Corp., Buffalo, N. Y.	Buffalo	31.10	35.68	41.89	40.15	30.60	26.15	20.15	33.05	41.05	43.95	49.30	56.61
G7 Georgetown Steel Corp., Georgetown, S.C.	Chicago	28.74	35.76	37.88	29.14	23.53	20.19	18.12	27.92	32.30	41.66	46.98	52.91
H1 Hercules Drawn Steel Corp., Livonia, Mich.	Cincinnati	29.70	35.07	37.78	29.88	24.42	20.21	18.50	29.32	34.22	42.79	47.25	52.89
I2 Ingersoll Steel Div., Newcastle, Ind.	Cleveland	28.48	34.22	37.48	36.74	23.60	23.58	18.89	31.34	38.19	42.83	47.48	54.28
I3 Inland Steel Co., Chicago	Denver	31.44	38.19	36.22	37.09	27.40	24.56	20.39	39.80	50.55	57.95	65.95	70.19
I4 Interlake Steel Corp., Chicago	Detroit	29.44	35.48	38.26	29.03	24.45	20.78	17.85	29.33	34.09	42.46	47.29	53.49
J2 Jessop Steel Corp., Washington, Pa.	Houston	27.67	28.71	31.69	29.21	26.73	26.27	21.60	40.15	45.96	52.87	58.95	66.14
J3 Jones & Laughlin Steel Corp., Pittsburgh	Kansas City	30.72	36.98	39.70	34.01	27.10	23.68	18.19	34.15	39.60	45.40	49.73	54.87
J4 Joslyn Mfg. & Supply Co., Chicago	Los Angeles	27.01	31.33	37.84	34.31	28.39	32.31	26.81	38.05	50.88	57.10	63.15	70.64
J5 Judson Steel Corp., Emeryville, Calif.	Memphis	24.31	32.51	35.34	31.89	26.17	21.51	20.49	34.05	36.78	49.96	59.80	69.44
K2 Keystone Consolidated Industries, Inc.	Milwaukee	29.00	34.67	37.64	31.22	24.52	21.64	18.11	28.10	33.82	42.06	46.47	52.90
K3 Kentucky Electric Steel Co., Ashland, Ky.	New York	32.47	38.99	42.55	43.38	32.66	25.31	21.35	36.35	42.26	46.93	51.84	56.22
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.	Philadelphia	28.10	38.99	41.23	43.50	31.05	27.15	19.28	32.14	42.50	47.75	55.07	60.50
L2 La Salle Steel Co., Chicago	Pittsburgh	35.27	40.97	45.23	43.45	37.60	30.44	21.58	30.44	38.43	44.64	49.90	54.10
L3 Lone Star Steel Co., Dallas	Portland	28.96	32.08	38.73	36.93	32.88	34.78	27.16	44.85	49.78	57.74	70.44	.....
L4 Lukens, Inc., Coatesville, Pa.	San Francisco	26.94	31.55	37.04	34.48	27.78	30.19	26.07	38.70	50.70	57.69	63.90	70.05
M2 McLouth Steel Products Corp., Detroit	Seattle	23.61	30.12	36.65	32.95	22.02	27.32	26.05	39.14	53.03	61.70	69.75	74.63
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.	Spokane	21.21	30.42	35.65	38.02	35.00	33.77	22.26	43.01	43.20	47.52	.....	58.32
M9 Moltrup Steel Products Co., Beaver Falls, Pa.	St. Louis	29.11	34.60	37.31	34.59	23.89	21.73	18.44	32.28	38.12	43.51	47.85	53.69
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.	St. Paul	28.87	33.61	35.61	38.36	23.81	22.48	17.99	32.18	37.52	42.72	47.09	53.31
N1 Northeast Precision Steel Co., Boston													

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Cold sheet—16 ga x 36—120; Hot-rolled strip—1/8" x 1"; Plate 1/4" x 84'; Shapes—1 Beams 8 x 12.5; Hot-rolled bar—Rounds 3/4-2 15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1 1/2" round; Cold drawn—1" round; Hot-rolled 4140—1 1/2" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

STEEL PRICES

Codes identify Producers listed on p. 72. [Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.] N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Re-rolling, Midwest	
W5, N4	\$366.00
West	
C6	\$346.00
Carbon Forging, East	
B3(2), C10, U1	\$473.00
R3	\$453.00
Midwest	
R3, W5	\$453.00
S1, U1, I3	\$473.00
C10	\$473.00
K2	\$473.00
West	
C6	\$420.00
Alloy, East	
R3	\$492.00
B3, U1, C10	\$512.00
Midwest	
W5	\$492.00
U1, C10, I3	\$512.00
R3	\$492.00
S1	\$512.00
West	
C6	\$469.00

Structurals

Carbon, East	
B3	22.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3, T10, N4	23.90
South	
C16	23.90
T10	22.90
High-Strength, Low Alloy, East	
B3	22.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
South	
C16	23.90
Wide Flange, Carbon, East	
B3	22.90
U1	21.50
J3	23.90
Midwest	
U1	21.50
N4	23.90
I3	23.90
Wide Flange, High-Strength-Low Alloy, East	
U1	24.30
Midwest	
U1	24.30

Strip

Hot-Rolled, Carbon, Cut II Edge—all widths, East	
U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1, A7	23.75
U1, B3, I3	23.75
M2, R3	22.05
South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75

S10	29.60
P15	24.80
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge, All widths, (plus extras)*	
Midwest	
M2, R3, W3, J3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge	
Midwest	
S1	37.05
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	26.10
I4	25.20
Alloy, Cold-Rolled, East (plus extras)*	
E4 M8	43.35
B4	49.75
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyrl)

East	
B3	23.75
I3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5, S1, B3, I3, A7	23.75
West	
U1	24.25
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2)	28.15
J3	26.15
U1	28.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.85
J3	26.15
D1	26.15
U1, W5, S1, B3, I3, A7	28.15
West	
U1	28.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	30.30
J3	30.30
Midwest	
J3, D1, W3	28.00
R3, Y1	28.00
G2, M11	30.00
U1, W5, S1, I3, A7	30.30
West	
U1	30.80
South	
R3	28.00
Enameling, Midwest	
U1, S1, I3, A7	29.65
J3	27.65
Long-Term, Midwest	
W5, A7, U1	31.65
R3	29.35

Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35

U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
East	per base box
J3	26.29
U1	28.99
Midwest	
U1	28.99
J3	26.29
M11	27.54
W3	26.29
W5	28.99
West	
U1	29.49
South	
U1	28.99
Double Reduced (55 lb)**	
Midwest	
M11	21.95
J3	21.49
U1	23.38
W3	21.49
W5	23.38
West	
U1	23.88
South	
U1	23.38
Black Plate	
Single Reduced (70 lb)*	
East	
B3	24.81
Midwest	
J3, W3	24.01
I3	24.57
W5	25.55
U1	26.27
M11	26.27
West	
U1	26.27
Double Reduced (55 lb)	
East	
B3	20.49
Midwest	
W5, M11, U1	20.49
J3	18.93
W3	18.93
West	
U1	20.49
South	
U1	20.49
*75 lb—base weight extra 69¢	
**50 lb—base weight extra \$1.40	

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3, R5	25.80
J3	25.80
U1, C10, B3(3)	27.05
Midwest	
I4	26.00
U1, I3	27.05
R3, T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
C16	25.80
Cold-Finished, Carbon, East	
A11	22.15
R3	33.75
T11, S8	31.00
J3(4), I2	31.00
M8, W10	31.00
N1	24.475
R4, B4	33.25
C10	31.00
Midwest	
W10, B3	33.25

J3	31.00
B1	33.45
L2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
West	
R3	37.15
South	
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
R5, K3	27.95
R3, J3	27.95
U1, B3(2), C10	29.20
Midwest	
R3	27.95
I3, C10, U1	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold-Drawn, East	
L2	35.20
R3, N1	37.90
R4	37.10
J3, W10, I2	34.85
T11 S8	34.85
C10	34.85
Midwest	
R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
L2	34.85
B5, M9	38.60
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3	23.25
I4, U1	25.75
P2	23.25
J3	26.75
Midwest	
B3	23.25
I3	25.75
J3, A7	22.80
U1, I4, S1	25.75
R3	26.75
West	
C6	24.25
U1	25.75
O2	23.00
South	
R3	25.75
U1	25.75
Alloy East	
B3	31.05
U1, I4	33.55
P2	33.55
J3	34.55
Midwest	
B3	31.05
I4, U1	33.55
West	
O2	31.00
South	
U1	33.55

Wire

Carbon Steel Wire, East	
B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

DURABLE ORDERS START THE YEAR ON AN UPBEAT

Other positive statistics notwithstanding, analysts say economic growth is slowing. To support this they point to the January factory orders rate, which dropped for the seventh time in 10 months.

Overall new orders for manufactured goods—non-durables and durables—dropped 0.8 pct to \$192.2 billion compared with \$193.9 billion in December. For durable goods manufacturers, however, the news was not that bad. Orders for durable goods—including machinery and major consumer items like household appliances—were up 1.9 pct to \$103.9 billion. Non-durable goods orders fell 4 pct in January.

Analysts attributed much of the decline to strong foreign competition that lured orders offshore.

The massive U.S. trade deficit is, holding back domestic growth, the Commerce Department conceded. But, the agency spokesman said, the Reagan Administration's forecast of 4 pct growth in the nation's economy this year is achievable.

In large part foreign goods are priced lower because of the rising value of the dollar. The surge in equipment imports, said Robert Ortner, Commerce's chief economist, has been so strong lately that the U.S. \$45 billion trade surplus in capital goods registered in 1981 now "has been obliterated."

Increases for durable goods orders came primarily from a 11.9 pct gain in orders for primary metals led by iron and steel castings—up 85.7 pct—and a 13.6 pct jump in orders for nonferrous metals.

Non-defense capital goods orders—a key indicator of business investment plans—declined 15.2 pct in January. Commerce officials said growth this year will be concentrated primarily in high-technology companies, the service category, home building and military goods.

Billions of Dollars, Seasonally adjusted
Monthly Total, unless otherwise noted
Source: U.S. Dept of Commerce

		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total*	4th Qtr.	\$321.4	\$313.1	\$283.9
Manufacturing, Total*	4th Qtr.	139.0	134.5	116.4
Manufacturing, Durable Goods*	4th Qtr.	67.5	65.4	54.9
Mining Industry*	4th Qtr.	12.9	12.6	12.4
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	January	103.9	102.0	100.9
Shipments	January	103.8	103.7	96.5
Inventories	January	191.3	190.8	177.8
Unfilled Orders	January	345.1	345.0	328.6
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	January	23.1	26.6	25.4
Capital Goods Producers, Defense Industries	January	9.5	8.5	6.6
Primary Metals, Total	January	11.3	10.1	12.7
Steel (SIC 331)	January	5.0	5.0	5.8
Iron & Steel Castings (SIC 332)	January	1.3	0.7	1.5
Nonferrous Metals	January	5.0	4.4	5.4
Nonelectrical Mach.-Equip. Industries, Total	January	14.9	16.4	16.8
Engines & Turbines	January	0.9	1.6	0.9
Farm Machinery & Equipment (Shipments)	January	0.6	0.8	1.0
Construction, Mining & Mat. Hdlg. Equip	January	2.6	2.6	2.6
General Industrial Machinery	January	1.2	1.3	1.2
Fluid Power Equipment** (Index-1972=100)	January	296.0	231.0	296.0
Metalworking Machinery	January	0.9	1.2	0.8
Machine Tools, Total (\$Mill., Unadjusted)***	January	211.9	255.2	191.0
Machine Tools, Metalcutting***	January	138.2	159.1	135.1
Machine Tools, Metalforming***	January	73.7	96.1	56.0
Electrical Mach. & Equip. Industries, Total	January	17.5	15.4	15.7
Elec. Transmission Equip. & Ind. Apparatus	January	2.1	2.5	1.8
Household Appliances	January	1.5	1.4	1.6
Communication Equipment	January	7.2	5.8	4.7
Transportation Equip. Industrial, Total	January	27.5	27.0	25.9
Motor Vehicles & Parts (Shipments)	January	20.0	17.0	17.0
Aircraft, Missiles & Parts	January	6.6	9.0	6.8
Shipbuilding & Military Tanks	January	1.0	0.5	0.9
Fabricated Metal Products, Total	January	12.9	13.0	10.9
Instruments, Total	January	5.0	5.0	4.7

*Est.—Commerce Dept. **Source: National Fluid Power Assn. ***Source: NMTBA

CHILTON'S

April 19, 1985

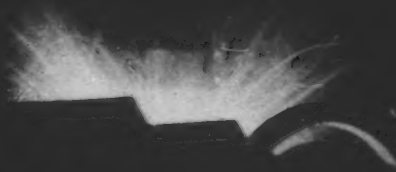
IRON AGE

MANUFACTURING MANAGEMENT

Is The International Trading System
On The Brink Of Collapse?

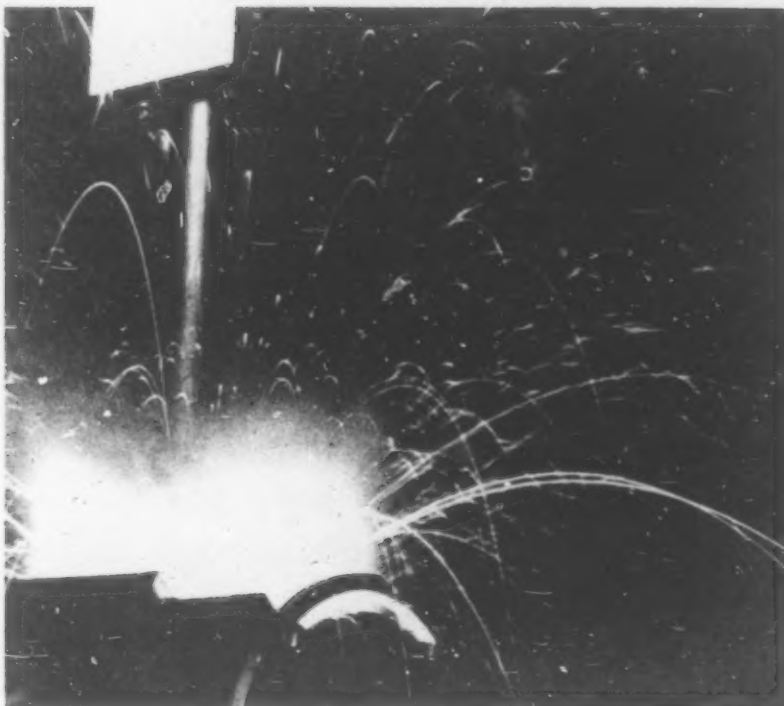
Today's Manager—Part One In
A Series: Middle Manager Morale
Sinks As Job Losses Mount

How Power Transmission
Manufacturers Are Using SPC
To Control Quality And Costs



CHILTON'S IRON AGE

MANUFACTURING MANAGEMENT



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ONE OF THE ABC PUBLISHING COMPANIES

PRICE & PRODUCTION DATA

(Effective March 25, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	192	197	184	251
Pittsburgh	245	235	223	296
Youngstown	111	120	109	110
Lake Erie	170	168	163	139
Detroit	149	151	143	172
Chicago	539	477	428	561
Cincinnati	92	97	100	106
St. Louis	84	78	81	85
Southern	206	223	185	234
Western	99	103	90	85
U.S. Production	1,887	1,849	1,706	2,050

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80% premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50%—Pickands Mather as of 1/27/81

86.9%—U.S. Steel as of 3/15/82. Cleveland Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82. and Hanna Mining as of 2/26/82

**Effective 8/1/83

NONFERROUS PRICES

(Effective March 25, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	49.56	49.23	3/25/85
Copper (C)	66.00-67.50	64.00-67.00	3/20/85
Lead	18.00-21.00	17.00-21.00	3/20/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	237.39	231.49	3/25/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	47.00	45.00-47.00	3/22/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: cathode grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.25-1.55
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per tray oz.	\$314.60
Indium, dollars per tray oz.	\$2.50-3.10
Iridium, dollars per tray oz.	\$510.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$310.00-319.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective March 25, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,887	1,849	19,905	22,415
Capacity Utilization Rate	72.9	71.4	65.6	73.2

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	26.939
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$86.83	\$86.83	\$83.83	\$90.83
No. 2 bundles	\$57.50	\$57.50	\$55.83	\$61.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$92.50	\$92.50	\$89.50	\$100.50
No. 1 steel, Philadelphia	82.50	82.50	81.50	84.50
No. 1 steel, Chicago	85.50	85.50	80.50	87.50
No. 1 bundles, Detroit	87.50	87.50	83.50	95.50
Low Phos., Youngstown	78.50	78.50	72.50	96.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	100.50
No. 1 mach'y cast., Chi	111.50	111.50	111.50	111.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per tray oz.	\$114.00
Platinum, per tray oz.	\$272.00
Rhodium, per tray oz.	\$1,025.00
Silver ingots, per tray oz.	\$6.30
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

March 18—\$11.84	March 21—\$20.56
March 19—\$16.07	March 22—\$21.62
March 20—\$18.58	

Scrap Prices

Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	61 1/2	49 1/2
Yellow brass	55	45 1/2
Red brass	57 1/4	46 3/4
Comm. bronze	57 1/8	47
Mang. bronze	57 1/8	44 3/4
Free cutting rod ends	51	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	56
No. 2 copper wire	47
Light copper	38

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	52
No. 2 copper wire	43
Light copper	34
No. 1 composition	47
No. 1 comp. turnings	44
Hvy. yellow brass solids	34
Hvy. yellow brass turnings	32
Radiators	38

Aluminum		
New mixed clips	36	—37
Old sheet	34	—35
Old cast	34	—35
Clean dry borings	34	—35

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	29	—30
Mixed L.C. clips	27	—28
Old sheets and cast	24	—26
Borings and turnings	22	—23
Duraluminum clippings	25	—26

Copper and Brass

No. 1 copper wire	45	—46
No. 2 copper wire	37	—38
Light copper	32	—33
Radiators	32	—33
No. 1 composition	40	—41
No. 1 composition turnings	37	—38
Cocks and faucets	30	—32
Clean heavy yellow brass	28	—29
Brass Pipe	28	—29
New soft brass clippings	41	—42

Lead

Heavy soft lead	7	—9
Whole batteries	1	—3
Type metal	16	—17
Electrotype	13	—14

Nickel

Nickel solids	120	—130
Nickel rod ends	120	—130
Nickel sheets, clips	120	—130
Nickel turnings	40	—45

Zinc

New zinc clippings	18	—19
Old diecast zinc	14	—15

MATERIALS PRICES

EFFECTIVE MARCH 25, 1985

(Effective March 25, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 92.00 to	\$ 93.00
No. 2 hvy. melting	82.00 to	83.00
No. 1 dealer bundles	107.00 to	108.00
No. 1 factory bundles (auto)	111.00 to	112.00
No. 2 bundles	56.00 to	57.00
No. 1 busheling	109.00 to	110.00
Machine shop turnings	70.00 to	71.00
Shoveling turnings	51.00 to	52.00
Cast iron borings	49.00 to	50.00
Low phos. punchings plate	111.00 to	112.00
Heavy turnings	82.00 to	83.00
No. 1 88 hvy. melting	97.50 to	98.00
Rails, 2 ft. and under	113.50 to	114.00
Scrap rails, random lgh	100.00 to	101.00
EE specialties	107.00 to	108.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	64.00 to	65.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	610.00 to	615.00
18-8 turnings	510.00 to	515.00

Chicago

No. 1 hvy. melting	\$ 85.00 to	\$ 86.00
No. 2 hvy. melting	81.00 to	82.00
No. 1 dealer bundles	98.00 to	99.00
No. 1 factory bundles (auto)	104.00 to	105.00
No. 2 dealer bundles	64.00 to	65.00
No. 1 busheling	100.00 to	101.00
Shredder scrap	97.00 to	98.00
Machine shop turnings	49.00 to	50.00
Mixed borings and turnings	50.00 to	51.00
Shoveling turnings	51.00 to	52.00
Cast iron borings	50.00 to	51.00
Low phos. forge scrap	118.00 to	119.00
Low phos. punchings plate		
1-4 in. and heavier	122.00 to	123.00
Low phos. 2 ft. and under	124.00 to	125.00
No. 1 88 hvy. melting	99.00 to	100.00
Scrap rails random lgh	92.00 to	93.00
Recoiler rails	106.00 to	107.00
Rails, 2 ft. and under	118.00 to	119.00
EE couplers and knuckles	104.00 to	105.00
EE car axles	123.00 to	124.00
No. 1 machinery cast	111.00 to	112.00
Cupola cast	102.00 to	103.00
Stove plate	99.00 to	100.00
Steel car wheels	107.00 to	108.00
Stainless		
18-8 bundles and solids	550.00 to	560.00
18-8 turnings	470.00 to	480.00
430 bundles and solids	135.00 to	140.00
430 turnings	105.00 to	110.00

Philadelphia

No. 1 hvy. melting	\$ 81.00 to	\$ 84.00
No. 2 hvy. melting	71.00 to	74.00
No. 1 dealer bundles	92.00 to	95.00
No. 2 dealer bundles	50.00 to	53.00
No. 1 busheling	92.00 to	95.00
Shredder scrap	95.00 to	98.00
Machine shop turnings	26.00 to	29.00
Mixed borings and turnings	26.00 to	29.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	92.00 to	95.00
Low phos. 2 ft. punchings	112.00 to	115.00
Electric furnace bundles	113.00 to	116.00
EE specialties	92.00 to	95.00
Rails, 2 ft. and under	112.00 to	115.00
Cupola cast	79.00 to	82.00
Heavy breakable cast	57.00 to	60.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 64.00 to	\$ 65.00
No. 2 hvy. melting	63.00 to	64.00
No. 1 dealer bundles	87.00 to	88.00
No. 2 bundles	38.00 to	40.00
No. 1 busheling	86.00 to	87.00
Drop forge flashings	55.00 to	56.00
Machine shop turnings	54.00 to	55.00
Mixed borings and turnings	28.00 to	29.00
Shoveling turnings	55.00 to	56.00
Cast iron borings	34.00 to	35.00
Heavy breakable cast	42.00 to	43.00
Mixed cupola cast	58.00 to	59.00
Automobile cast	82.00 to	83.00
Stainless		
18-8 bundles and solids	475.00 to	485.00
18-8 turnings	380.00 to	390.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	\$ 75.00 to	\$ 78.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	87.00 to	89.00
No. 2 dealer bundles	35.00 to	36.00
Machine shop turnings	11.00 to	14.00
Shoveling turnings	16.00 to	19.00
Low phos. plate	77.00 to	80.00
Electric furnace bundles	75.00 to	78.00
Galvanized bundles	65.00 to	68.00

Cleveland

No. 1 hvy. melting	\$ 70.00 to	\$ 73.00
No. 2 hvy. melting	42.00 to	45.00
No. 1 dealer bundles	84.00 to	87.00
No. 2 dealer bundles	35.00 to	36.00
No. 1 busheling	87.00 to	90.00
Machine shop turnings	12.00 to	15.00
Mixed borings and turnings	13.00 to	16.00
Shoveling turnings	15.00 to	18.00
Cast iron borings	15.00 to	18.00
Cut structural & plates, 2 ft. and under	118.00 to	121.00
Low phos. punchings plate	118.00 to	121.00
Drop forge flashings	55.00 to	58.00
Foundry steel, 2 ft. & under	74.00 to	77.00
No. 1 88 hvy. melting	84.00 to	87.00
Rails, 2 ft. and under	119.00 to	122.00
Rails, 18 in. and under	118.00 to	121.00
Steel axle turnings	56.00 to	59.00
Railroad cast	87.00 to	90.00
No. 1 machinery cast	97.00 to	100.00
Cupola cast	55.00 to	58.00
Stove plate	57.00 to	60.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	325.00 to	335.00
430 bundles	80.00 to	85.00

Buffalo

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 69.00 to	\$ 70.00
No. 2 hvy. melting	57.00 to	58.00
No. 1 busheling	84.00 to	85.00
No. 1 dealer bundles	83.00 to	84.00
No. 2 bundles	43.00 to	44.00
Machine shop turnings	17.00 to	19.00
Mixed borings and turnings	18.00 to	19.00
Shoveling turnings	31.00 to	32.00
Cast iron borings	28.00 to	29.00
Low phos. plate	97.00 to	98.00
Structural and plate, 2 ft. and under	100.00 to	101.00
Rails, 2 ft. and under	100.00 to	101.00
Scrap rails, random lgh	74.00 to	75.00
No. 1 machinery cast	80.00 to	81.00
No. 1 cupola cast	60.00 to	61.00

St. Louis

No. 1 hvy. melting	\$ 69.00 to	\$ 70.00
No. 2 hvy. melting	56.00 to	57.00
Foundry steel, 2 ft.	64.00 to	65.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	51.00 to	52.00
Machine shop turnings	19.00 to	20.00
Shoveling turnings	25.00 to	26.00
Cast iron borings	29.00 to	30.00
No. 1 88 hvy. melting	69.00 to	70.00
Rails, random length	68.00 to	69.00
Rails, 18 in. and under	84.00 to	85.00
EE specialties	83.00 to	84.00
Cupola cast	76.00 to	77.00
Heavy breakable cast	54.00 to	55.00
Stove plate	91.00 to	92.00
Steel car wheels	100.00 to	101.00
Recoiler rails	80.00 to	81.00
Unstripped motor blocks	63.00 to	64.00

Birmingham

No. 1 hvy. melting	\$ 73.00 to	\$ 74.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	77.00 to	78.00
No. 2 bundles	50.00 to	51.00
No. 1 busheling	77.00 to	78.00
Shredder scrap	102.00 to	103.00
Machine shop turnings	29.00 to	30.00
Shoveling turnings	42.00 to	43.00
Cast iron borings	39.00 to	40.00
Electric furnace bundles	74.00 to	75.00
Elec. furnace, 3 ft. & under	74.00 to	75.00
Structural and plate, 2 ft.	100.00 to	101.00
Structural and plate, 4 ft.	94.00 to	95.00
No. 1 88 hvy. melting	94.00 to	95.00
Scrap rails, random lgh	90.00 to	91.00
Rails, 2 ft. and under	105.00 to	106.00
Angles and splice bars	92.00 to	93.00
No. 1 cupola cast	87.00 to	88.00
Unstripped motor blocks	75.00 to	76.00

Cincinnati

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 57.00 to	\$ 58.00
No. 2 hvy. melting	55.00 to	56.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	9.00 to	10.00
Cast iron borings	21.00 to	22.00
Low phos. 18 in. and under	88.00 to	89.00
Rails, random length	69.00 to	70.00
Rails, 2 ft. and under	82.00 to	83.00
No. 1 cupola cast	62.00 to	63.00
Heavy breakable cast	27.00 to	28.00
Drop broken cast	78.00 to	79.00

New York

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 47.00 to	\$ 48.00
No. 2 hvy. melting	38.00 to	39.00
No. 2 dealer bundles	23.00 to	27.00
Mixed borings and turnings	11.00 to	13.00
Machine shop turnings	6.00 to	7.00
Shoveling turnings	14.00 to	15.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	505.00 to	525.00
18-8 turnings	405.00 to	425.00
430 prepared solids	90.00 to	110.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 58.00 to	\$ 60.00
No. 2 hvy. melting	48.00 to	50.00
No. 1 dealer bundles	61.00 to	63.00
No. 2 bundles	35.00 to	37.00
No. 1 busheling	70.00 to	72.00
Shredder scrap	67.00 to	69.00
Machine shop turnings	10.00 to	12.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	81.00 to	86.00
Mixed cupola cast	48.00 to	50.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	\$ 44.00 to	\$ 46.00
No. 2 hvy. melting	38.00 to	40.00
No. 1 dealer bundles	35.00 to	37.00
No. 2 dealer bundles	20.00 to	22.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	81.00 to	83.00

Los Angeles

No. 1 hvy. melting	\$ 47.00 to	\$ 49.00
No. 2 hvy. melting	40.00 to	42.00
No. 1 dealer bundles	38.00 to	40.00
No. 2 dealer bundles	20.00 to	22.00
Machine shop turnings	13.00 to	14.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under		
(foundry)	74.00 to	76.00
No. 1 cupola cast	75.00 to	77.00

Seattle

No. 1 hvy. melting	66.00 to	68.00
No. 2 hvy. melting	57.00 to	59.00
No. 2 bundles	40.00 to	42.00
No. 1 cupola cast	92.00 to	93.00
Mixed yard cast	82.00 to	84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 86.00	
No. 2 hvy. melting, cut 2 ft. and under	78.00	
No. 1 dealer bundles	84.00	
No. 2 bundles	60.00	
Mixed steel scrap	60.00	
Bush new fact. prep'd	86.00	
Bush new fact. unprep'd	75.00	
Machine shop turnings	33.00	
Short steel turnings	35.00	
Mixed borings and turnings	25.00	
Cast scrap	95.00	

Houston

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 78.00 to	\$ 79.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	49.00 to	50.00
No. 2 bundles	17.00 to	18.00
Machine shop turnings	34.00 to	35.00
Crushed turnings	86.00 to	87.00
Shredder scrap	34.00 to	35.00
Cut structural plate, 2 ft. and under	105.00 to	106.00
Cut structural plate, 5 ft. and under	89.00 to	90.00
Unstripped motor blocks	60.00 to	61.00
Cupola cast	87.00 to	88.00

DOLLAR'S STRENGTH KEEPS PRICES IN LINE

The strength of the dollar is being given the lion's share of the credit for keeping producer prices stable.

February producer prices fell 0.1 pct largely as a result of lessened demand abroad and price competition from low-priced foreign goods in the U.S. The major individual contributor to the decline was energy prices. Gasoline prices dropped 3.4 pct. Fuel oil prices were off 3.6 pct, though February is a peak month of the heating season.

Among the other notable February declines was a drop of 0.2 pct in producer goods other than food and energy. That grouping had posted a large 0.6 pct rise in January. The February slowdown was mainly attributable to a re-evaluation of, and some changes in, prices of autos and light motor trucks.

Analysts point out the strength of the dollar abroad makes the prices of intermediate goods and crude materials prohibitively expensive, thus reducing demand for them. In addition, the increase in imports of less expensive foreign goods forces domestic producers to be more price competitive.

As good as the price picture looks for finished goods, the view is even better at the beginning. Raw materials prices dropped again—1.9 pct—for the third consecutive month. This means that price moderation will be reinforced as the raw materials move through the pipeline.

Many economic analysts believe continued demand for consumer goods and capital equipment should continue to stimulate production in the coming months. The negative is the apparent continued loss of domestic business to foreigners, said Commerce Department chief economist Robert Ortner.

Capital equipment prices rose 0.5 pct during February, after rising 0.4 pct the previous month.

Latest Month Covered: February 1985

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	390.2	+ 0.2	+ 1.8
Metal Forming Machine Tools	432.1	+ 0.5	+ 3.1
Agricultural Machinery & Equip.	338.3	— 0.1	+ 2.1
Construction Machinery & Equip.	361.7	+ 0.4	+ 1.6
Industrial Process Furnace & Ovens	382.4	+ 0.2	+ 3.2
Industrial Material Handling Equip.	292.9	+ 0.2	+ 1.9
Pumps, Compressors & Allied Equip.	353.1	0	+ 1.8
Fluid Power Equip. (Dec. 1970 = 100)	262.6	+ 0.3	+ 3.0
Mechanical Power Transmission Equip.	334.9	— 0.1	+ 4.0
Automobiles	227.2	0	+ 2.4
Motor Trucks—Light	296.1	+ 0.6	+ 5.4
Motor Trucks—Heavy	331.8	+ 0.2	+ 1.6
Railroad Equipment	361.7	+ 0.8	+ 2.9
Fabricated Metal Structural Products	313.3	+ 0.2	+ 2.1
Electric Motors	348.5	— 0.1	+ 3.2
Valves & Fittings (Dec. 1982 = 100)	104.1	+ 0.5	+ 3.5
Ball & Roller Bearings	346.0	+ 0.1	+ 2.9
Cutting Tools & Accessories	285.0	0	+ 2.9
Heating Equipment	257.4	+ 0.3	+ 3.7
Plumbing Fixtures & Brass Fittings	307.1	+ 0.2	+ 3.6
Metal Containers	358.3	+ 0.2	+ 3.9
Miscellaneous Metal Products	301.9	0	+ 3.7

Data based on U.S. Labor Dept.'s Producer Price Index

CHILTON'S

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May 3, 1985

IRON AGE

MANUFACTURING MANAGEMENT

**SERVICE CENTERS FACE GROWTH
THE HARD WAY**



**ANNUAL STEEL/NONFERROUS
FINANCIAL ANALYSIS**

**ADVANCED CERAMICS TOUGHEN UP
THEIR ACT**

**SPECIAL INDUSTRIAL DEFENSE REPORT:
CAN THE U.S. FORGING & CASTING
INDUSTRIES CUT IT?**

EX-IM'S I-MATCH: THE FIRE WITHIN

IRON AGE



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ANNUAL STEEL/NONFERROUS FINANCIAL ANALYSIS

STEEL

It's a long road back to profitability for the American steel industry—a road with its share of sharp turns and potholes, a road that stretches toward a dimly perceived horizon.

Most seem to be making the trek, if the figures listed on the subsequent pages of this year's Financial Analysis are any indication. Shipments in 1984 are up from the previous year's recession level. Operating profits are stronger and net incomes, while still in the red in some instances, are better than the year earlier totals.

But it's a long road. Many in the industry learned or relearned that lesson last year. The first quarter saw orders rolling into the mills. Four the seven largest mills reported profits for the quarter compared with the year earlier period, when all were awash in red ink.

The economy was growing at a heady pace. Auto sales were on the rise. Some believed that the industry might one day look back at the first quarter of 1984 as the turning point in the industry's fortunes.

By the end of the second quarter, the road back had become steeper. By the third quarter, progress was reversed. Shipments had fallen from 20 million tons in the previous three-month span to 17 million tons. Imports were flowing in at a heavier pace and the service centers were cutting back on inventory.

Prices remained soft through much of the year, a trend that troubled many earlier when the shipment volume began to climb. Without some strength in the price sheets, there would be little to look forward to on the bottom line.

The fourth quarter brought some hope. The Reagan Administration announced its voluntary import program designed to limit foreign shipments to an estimated 18 pct of the

The steel and nonferrous industries began their climb out of the depths of the recession, but there were, and still are, some hurdles along the route.

BY MICHAEL MARLEY
AND ROBERT REGAN

domestic market. The industry, while embracing the long-sought after relief, seemed a bit sanguine about the prospects it held.

Most were cautious in their estimates of the Reagan program's impact on this year's shipments, warning that the market was still saturated with foreign steel. The long trek through three years of recession has altered expectations.

The first quarter seemed to hold out the promise that the plant closings and belt tightening of the previous year would begin to payoff. With breakeven points at what might be the lowest they have ever been, there was reason to expect a return to profitability. Unfortunately, it still lays somewhere out in the future.

NONFERROUS

For most of the nonferrous metals industry, 1984 was a year of trudging uphill against a soaring U.S. dollar. Low-priced imports proved formidable on many fronts: aluminum ingot and mill products, primary copper and copper and brass mill products, zinc and any number of metal-bearing finished products.

Domestic producer prices remained depressed by competitively-priced imports, as well as by unwieldy inventories and by overseas production seemingly spurred by access to the U.S. market and less responsive to generally supply-demand situations. The impact was

quite evident in the profits (and losses) column, leaving the benefits of the 1983-84 business recovery confined to the sales column.

More recent softness of the dollar on international money markets contributed to firmer prices for copper and nickel early in the second quarter. In both cases, it also was a matter of declining inventories, particularly on the hedge markets, finally being allowed to make themselves felt.

For the U.S. copper producers, 1984 wasn't much to write home about. Consumption was up, but the producers lost another bid for import quotas and their foreign competitors displayed little inclination to trim production. The pattern of mine and smelter shutdowns continued well into 1985. Imports of copper and brass mill products soared, thereby cutting into available business for the domestic producers.

U.S. and Canadian aluminum producers were also hit by a double whammy last year. Base ingot prices were held down by a too-fast return to normal production levels, rising production in Australia and elsewhere, rising hedge market stocks and the soaring dollar. The latter also contributed to a sharp rise in shipments of mill products to U.S. markets that ran the gamut from common alloy items to can stock. Substantial ingot production cutbacks, mainly in the U.S., still weren't showing up in the aggregate producer inventory well into 1985.

Additional copies of the 1984 Steel/Nonferrous Metals Industries Financial Analysis may be obtained by writing Iron Age Readers Service Department, Chilton Way, Radnor Pa., 19089. Copies are \$2 each. Enclose check or money order with your request.

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1-2

IRON AGE STEEL INDUSTRY FINANCIAL ANALYSIS

Company ¹	Year	Raw Steel Production Thousands of Net Tons	Steel Shipments Thousands of Net Tons	Net Sales & Operating Revenues 000 of \$	Employment Costs 000 of \$	Employment Costs as Percent of Sales	Operating Profit ² 000 of \$	Operating Profit as Percent of Sales	Depreciation Depletion and Amortization 000 of \$	Provision for Federal Income Taxes 000 of \$	Net Income 000 of \$	Net Income Percent of Sales	Invested Capital (to include funded debt payable after one year preferred and common stock surplus) 000 of \$	Net Income Percent of Investment ³	Working Capital 000 of \$	Funded debt (Payable after one year) 000 of \$	Interest Expense on Funded debt 000 of \$	Capital Expenditures 000 of \$	Stockholders' Equity ⁴ 000 of \$	Pct Return on Stockholders' Equity	Number of Common Shares Outstanding 000 of \$	Common Dividend Declared 000 of \$	Number of Earnings Per Common Share	Dividends Per Common Share	Price Range Common Share	P/E Ratio	
1. United States Steel Corp. ^{5,6,7}	1984	15,100	12,100	19,104,000	3,320,000	17.4	3,287,000	17.2	1,241,000	566,000	493,000	2.6	13,497,000	11.2	541,000	6,261,000	1,019,000	947,000	5,972,000	8.3	107,193	2,144,000	106,000	3.52	1.00	33 1/4-22	9-6
	1983	14,800	11,300	17,539,000	3,780,000	21.6	1,886,000	10.8	1,104,000	(62,000)	(1,161,000)	(6.6)	13,999,000	(2.2)	789,000	7,164,000	856,000	1,827,000	5,605,000	(20.7)	104,639	2,093,000	103,000	(12.07)	1.00	31-19 3/8	(3)-(2)
2. Bethlehem Steel Corp.	1984	12,166	8,925	5,392,100	2,169,900	40.2	288,600	5.4	282,600	18,000	(112,500)	(2.1)	2,422,300	—	147,300	1,265,300	111,700	309,000	1,157,000	(12.4)	46,544	566,200	27,900	(2.91)	.60	29 1/2-14 1/4	—
	1983	10,692	8,744	4,898,200	2,202,700	45.0	107,000	2.2	251,700	68,000	(163,500)	(3.3)	2,447,300	(2.8)	270,400	1,134,200	94,500	269,400	1,313,100	(14.1)	46,250	559,400	26,600	(3.92)	.60	28 1/2-19	—
3. LTV Corp. ^{8,9,10,11}	1984	9,971	8,265	7,046,100	2,176,000	30.9	39,000	0.6	194,000	(27,400)	(378,200)	(5.4)	3,728,800	(3.4)	576,500	2,226,900	250,600	205,500	1,366,200	(30.2)	83,186	821,462	12,180	(5.84)	.1875	19 7/8-8 7/8	(1.7)
	1983	7,653	5,811	4,577,800	1,534,300	33.5	13,200	0.3	110,100	(13,500)	(180,700)	(4.0)	2,757,500	(0.9)	537,400	1,560,200	154,900	254,700	1,142,000	(16.0)	54,649	1,004,175	13,171	(3.64)	.25	19 1/8-11 1/8	(3.8)
4. Inland Steel Co.	1984	6,479	4,994	3,324,838	1,006,690	30.3	166,814	5.0	126,688	6,123	(41,366)	(1.2)	1,981,492	1.1	339,523	834,324	62,292	185,104	1,147,168	—	25,054	351,572	12,533	(1.97)	.50	32 1/4-19 7/8	—
	1983	6,306	4,762	2,919,388	1,084,396	37.1	5,012	0.2	121,832	(68,377)	(116,900)	(4.0)	1,918,969	—	232,737	787,659	65,343	103,125	1,131,310	—	24,727	346,498	12,420	(4.76)	.50	35-24 3/4	—
5. Armco Inc. ^{12,13}	1984	5,911	4,556	4,543,100	1,596,500	35.1	148,300	3.3	170,100	4,700	(295,000)	(6.5)	1,744,000	(11.5)	308,000	744,600	95,000	133,300	999,400	(25.8)	67,048	335,300	13,300	(4.55)	.20	23 3/8-9	—
	1983	5,787	4,324	4,164,600	1,643,200	39.5	(198,800)	(4.8)	195,500	(5,200)	(672,500)	(16.1)	2,120,900	(27.6)	562,600	832,000	87,500	149,200	1,288,900	(41.1)	66,245	331,300	32,900	(10.27)	.50	21 1/4-15 7/8	—
6. National Steel Corp.	1984	4,812	4,524	2,293,145	—	—	180,426	7.9	96,610	937	20,839	0.9	1,104,380	7.2	161,435	425,196	58,582	75,512	679,184	3.1	—	—	—	—	—	—	—
	1983	4,576	4,034	2,021,625	—	—	94,035	4.7	108,339	(1,335)	(161,396)	(8.0)	1,118,675	(9.5)	60,875	460,330	55,224	49,165	658,345	(19.4)	—	—	—	—	—	—	—
7. Weirton Steel Corp. ^{14,15}	1984	2,795	2,108	1,075,125	310,198	28.9	88,890	8.3	2,832	—	60,622	5.6	239,295	36.0	179,856	153,926	20,043	37,515	60,622	—	—	—	—	—	—	—	—
	1983	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
8. Nucor Corp.	1984	1,725	1,518	660,260	142,895	21.6	114,977	17.4	28,899	34,000	44,548	6.7	342,835	14.2	152,920	43,232	4,222	26,075	299,603	16.0	14,113	24,567	5,082	3.16	.36	44 1/4-26	14.0-8.2
	1983	1,575	1,441	542,531	118,693	21.9	81,429	15.0	27,110	19,700	27,864	5.1	303,861	10.6	105,402	45,731	4,458	19,617	258,130	11.4	14,044	22,561	4,217	1.98	.30	42 1/4-30 1/8	21.6-15.2
9. Florida Steel Corp. ¹⁶	1984	1,010	919	286,108	61,545	21.5	16,622	5.8	9,167	4,363	6,662	2.3	141,356	9.3	50,086	51,545	6,430	5,500	89,811	7.4	5,975	8,920	2,386	1.12	.40	25 3/8-13	—
	1983	752	718	235,109	56,826	24.2	6,771	2.9	9,362	4,600	(4,677)	(2.0)	143,444	1.4	47,805	58,353	6,685	5,052	85,091	5.5	5,965	8,476	2,385	(.78)	.40	30 1/4-11 1/4	—
10. Chaparral Steel Corp.	1984	981	879	247,453	31,634	12.8	34,425	13.9	12,935	(5,532)	(8,509)	(3.4)	199,435	9.1	21,886	174,935	26,690	4,574	63,212	(13.5)	4,500	4,500	—	(1.89)	—	—	—
	1983	884	769	212,876	34,373	16.2	23,661	11.1	14,381	(10,956)	(13,221)	(6.2)	184,966	6.6	8,126	171,966	25,336	320	60,219	(22.0)	4,500	4,500	—	(2.94)	—	—	—
11. CF&I Steel Corp. ^{17,18,19,20,21}	1984	770	581	325,252	105,826	32.4	24,777	7.6	14,759	(13,399)	(28,146)	(8.7)	105,288	(25.1)	27,460	23,519	1,691	7,580	81,769	(34.4)	3,966	19,829	—	(7.10)	—	30-13	—
	1983	614	501	231,093	97,450	42.2	(56,310)	(24.4)	38,483	(49,361)	(94,203)	(40.8)	134,377	(64.8)	(4,187)	24,463	7,119	19,547	109,914	(85.7)	3,966	19,829	—	(23.75)	—	28-21 1/2	—
12. Northwestern Steel & Wire Co.	1984	744	541	205,164	86,070	42.0	(30,459)	(14.8)	15,254	(14,229)	(34,296)	(16.7)	236,767	(13.3)	83,321	44,000	2,812	14,470	192,767	(16.3)	7,506	37,532	—	(4.57)	—	25 3/8-14 1/2	(6)-(3)
	1983	417	408	167,690	81,793	48.8	(25,661)	(15.3)	14,803	(21,383)	(19,162)	(11.4)	237,063	(8.0)	85,898	10,000	81	15,615	227,063	(8.4)	7,506	37,532	2,252	(2.55)	.30	26 1/4-15 1/8	(10)-(6)
13. Laclede Steel Co.	1984	721	494	228,924	77,483	33.8	17,236	7.5	3,590	4,497	7,409	3.2	101,520	9.0	56,750	24,295	1,740	5,517	77,225	9.6	2,704	54,329	—	2.74	—	17-13	6-5
	1983	618	418	190,149	69,886	36.8	11,921	6.3	5,580	—	5,048	2.1	85,112	8.8	47,512	15,295	2,404	2,493	69,817	7.2	2,704	54,329	—	2.24	—	18-10	8-4
14. Cyclops Corp.	1984	587	869	1,271,593	298,771	23.5	57,438	4.5	17,731	11,528	18,434	1.4	292,611	8.2	179,190	98,843	9,745	24,878	193,768	10.7	4,098	4,098	4,116	4.82	1.10	39 3/8-27 1/2	—
	1983	549	790	1,024,114	269,827	26.4	18,975	1.9	17,849	(4,257)	(2,190)	(0.2)	265,282	0.3	142,131	92,597	7,573	21,223	172,685	(1.3)	3,877	3,877	3,880	(.72)	1.10	36 1/2-19	—
15. Interlake Inc. ^{22,23,24,25}	1984	576	437	845,087	260,424	30.8	101,011	12.0	22,325	31,793	36,551	4.3	478,790	8.8	164,336	112,898	10,128	22,843	323,264	11.5	5,467	74,470	14,095	6.68	2.60	51 1/8-41	6.7
	1983	518	378	763,549	239,618	31.4	70,347	9.2	21,780	14,276	22,824	3.2	475,877	6.0	202,860	115,994	10,370	15,829	327,401	7.1	5,834	90,917	15,060	3.94	2.60	44 1/4-31 1/4	11.2
16. Copperweld Corp.	1984	491	512	446,646	142,300	31.9	22,609	5.1	18,265	2,825	176	—	248,475	3.7	70,597	87,447	8,984	10,403	161,028	0.1	8,611	7,176	5,044	.24	.58	23 1/4-11 3/8	—
	1983	366	317	328,238	122,500	37.3	2,456	0.1	19,281	(21,484)	(24,268)	(7.5)	254,883	(6.1)	67,825	91,135	8,794	13,976	163,748	(14.5)	8,609	7,174	4,993	(2.90)	.58	21 3/4-15	—
17. Lukens Inc. ²⁶	1984	483	—	416,384	—	—	38,214	9.2	19,343	3,780	4,701	1.1	195,643	7.7	40,118	69,798	10,390	17,086	125,845	3.8	5,165	3,180	2,066	.91	.40	16 1/4-10 1/8	18.0-11.1
	1983	429	—	342,855	—	—	5,712	1.7	19,699	(10,244)	(14,012)	(4.1)	208,036	(1.8)	47,689	84,598	10,269	8,575	123,438	(10.0)	5,155	3,180	2,070	(2.71)	.40	17 1/2-11 3/8	(6.5)-(4.3)
18. Continental Steel Corp.	1984	403	—	125,010	—	—	(11,310)	(9.0)	(5,872)	—	(19,954)	(16.0)	70,421	(24.3)	14,654	52,250	2,772	22,930	15,877	(125.7)	22,758	66,434	—	(.92)	—	27 1/8-1/2	—
	1983	354	—	111,020	—	—	(3,532)	(3.2)	(5,077)	—	(9,938)	(8.9)	60,509	(14.2)	23,195	33,411	1,329	12,062	27,098	(36.6)	17,419	63,367	—	(.72)	—	3 3/8-7/16	—
19. Carpenter Technology ²⁷	1984	—	—	528,824	204,643	38.7	76,148	14.4	16,995	21,379	33,441	6.3	433,447	8.7	176,514	126,239	4,333	49,024	307,208	10.9	8,752	44,925	18,289	3.84	2.10	58 1/4-42	11.0
	1983	—	—	397,451	162,123	40.8	35,746	9.0	14,571	4,354	16,042	4.0	349,774	4.8	110,477	60,762	779	71,853	289,012	5.6	8,679	44,561	18,130	1.86	2.10	48-28	23.7
20. Athlone Industries, Inc.	1984	—	—	281,935	—	—	25,251	9.0	5,282	3,223	6,048	2.1	153,659	11.8	60,527	99,007	12,087	8,738	54,651	11.1	2,399	240	3,831	2.15	1.60	28 3/4-18 3/8	7.6
	1983	—	—	234,107	—	—	13,124	5.6	4,957	228	(493)	(0.2)	124,028	6.4	50,995	67,253	8,432	2,237	56,775	(0.9)	2,395	240	3,750	(.59)	1.60	26-16 1/2	—
GRAND TOTAL	1984	28	28	48,647,498	11,972,879	29	4,685,969	9.5	2,292,503	652,588	(185,540)	(0.4)	27,717,514	5.6	3,380,043	12,785,371	1,736,713	2,135,656	13,306,980	(1.4)	—	—	—	—	—	—	—
	1983	28	28	40,902,205	1																						

IRON AGE NONFERROUS FINANCIAL ANALYSIS

Company ¹	Year	Net Sales and Operating Revenues 000 of \$	Operating Profit 000 of \$	Operating Profit as Percent of Sales	U.S. and Foreign Income Taxes 000 of \$	Extraordinary Income (Loss) 000 of \$	Net Earnings 000 of \$	Net Earnings as Percent of Sales	Net Earnings per Common Share	Dividends Per Common Share	Number Common Shares Outstanding at Year End	Stockholders Equity 000 of \$	Net Earnings as Percent of Stockholders Equity	Funded and Other Long Term Debt 000 of \$	Invested Capital 000 of \$	Long term Debt as Pct of Invested Capital	Net Earnings as Percent of Invested Capital	Working Capital 000 of \$	Capital Spending 000 of \$	Retained Earnings At End of Year 000 of \$	
1. Alcan Aluminium Ltd.	1984	5,467,000	388,000	7.0	151,000	—	253,000	4.6	2.59	1.20	99,118,000	2,916,000	8.9	1,350,000	4,266,000	31.6	5.9	1,488,000	427,000	2,103,000	1.
	1983	5,208,000	159,000	3.0	73,000	—	73,000	1.4	0.81	.90	96,929,000	2,799,000	2.6	1,499,000	4,298,000	34.9	1.7	1,452,000	382,000	1,967,000	
2. Aluminum Co. of America	1984	5,750,835	367,530	6.4	150,000	—	256,048	4.5	3.13	1.20	81,140,879	3,343,592	7.8	1,634,893	4,978,485	32.8	5.1	985,933	593,672	2,881,160	2.
	1983	5,263,431	154,884	2.9	49,600	9,681	174,231	3.3	2.15	1.20	80,939,222	3,227,511	5.5	1,683,139	4,910,650	34.3	3.5	939,395	410,689	2,724,864	
3. Alumas Inc.	1984	1,973,600	235,300	11.9	69,400	—	126,000	6.4	—	—	—	737,500	18.0	453,800	1,216,200	37.3	10.4	589,700	116,600	536,400	3.
	1983	1,510,200	150,000	9.9	55,600	—	71,400	4.7	—	—	—	661,600	11.2	377,700	1,064,100	35.5	6.7	489,200	30,500	457,300	
4. AMAX Inc.	1984	2,398,900	186,600	7.8	39,200	(206,000)	(238,300)	—	—	.20	68,601,683	1,610,300	—	982,000	2,592,300	37.9	—	32,000	130,500	221,600	4.
	1983	2,290,100	53,400	2.3	45,900	(309,000)	(489,000)	—	—	.20	66,448,649	1,861,900	—	1,127,700	2,989,600	37.7	—	5,900	124,900	495,100	
5. Asarco Inc.	1984	1,325,129	14,791	1.1	(3,566)	—	(306,080)	—	—	.30	31,478,223	692,588	—	541,105	1,233,693	43.9	—	139,600	34,570	519,377	5.
	1983	1,512,236	69,283	4.6	18,892	—	58,329	3.9	1.54	.40	28,254,434	1,024,657	5.9	490,143	1,514,800	32.4	3.9	243,071	105,172	852,952	
6. Brush Wellman Inc.	1984	322,595	72,330	22.4	27,918	—	41,539	12.9	2.20	.47	18,623,780	210,550	21.5	27,627	238,177	11.6	17.4	107,506	29,626	162,465	6.
	1983	245,515	47,172	19.2	17,530	(68)	25,697	10.5	1.39	.42	18,482,412	176,240	16.7	31,650	207,890	15.2	12.4	88,166	19,805	129,711	
7. Cominco Ltd.	1984	1,585,292	307,960	19.4	(5,166)	5,222	24,179	1.5	0.17	.15	64,304,128	880,129	2.8	617,153	1,497,982	41.2	1.6	159,844	122,894	491,442	7.
	1983	1,374,723	197,711	14.4	(26,738)	—	(39,325)	—	—	.13	63,025,569	869,904	—	649,400	1,519,300	42.7	—	184,024	106,336	490,615	
8. Falconbridge Ltd.	1984	733,312	97,041	13.2	926	51,492	80,186	10.9	3.98	—	7,266,930	635,994	13.7	283,842	919,836	30.9	8.7	414,661	102,760	401,918	8.
	1983	615,387	(4,122)	—	2,717	14,186	(16,593)	—	—	—	7,028,030	532,285	—	416,135	1,018,420	47.7	—	472,168	46,449	322,794	
9. Inco Ltd.	1984	1,467,984	74,695	5.1	22,170	—	(77,343)	—	—	.20	98,062,274	1,315,623	—	1,050,350	2,365,973	44.4	—	494,361	103,578	486,975	9.
	1983	1,173,421	(187,902)	—	(91,292)	—	(234,894)	—	—	.20	97,462,791	1,362,725	—	1,055,705	2,418,430	43.7	—	528,085	71,079	606,658	
10. Kaiser Aluminum & Chemical Corp.	1984	3,192,500	(80,100)	—	(88,000)	—	(53,900)	—	—	.60	43,786,000	1,170,700	—	1,222,000	2,392,700	51.1	—	328,200	242,300	864,600	10.
	1983	2,469,700	(150,300)	—	(105,100)	—	(74,900)	—	—	.60	43,388,000	1,232,000	—	1,104,500	2,337,200	47.3	—	390,900	193,400	946,100	
11. Phelps Dodge Corp.	1984	910,067	(94,400)	—	(19,000)	(85,000)	(267,846)	—	—	—	24,642,950	828,700	—	591,185	1,419,886	41.6	—	112,615	69,646	480,347	11.
	1983	952,115	(53,800)	—	(38,984)	—	(63,497)	—	—	—	24,642,950	981,029	—	600,263	1,622,582	37.0	—	132,436	59,190	756,243	
12. Reynolds Metals Co.	1984	3,728,300	201,800	5.4	30,400	6,300	137,300	3.7	6.36	1.00	21,557,739	1,341,100	10.2	1,146,100	2,487,200	46.1	5.5	554,500	429,200	1,077,200	12.
	1983	3,340,800	(190,000)	—	(144,000)	—	(99,100)	—	—	1.00	21,177,424	1,219,600	—	916,700	2,136,300	42.9	—	384,500	267,200	962,000	

Alcan Aluminium Ltd.: Net income for 1984 and 1983 includes benefits from tax-loss carry-forwards of \$37 million and \$15 million respectively.

Aluminum Co. of America: Results for 1984 include writedowns of \$41 million from a refinery, \$7.5 million from an equity investment and \$5 million from construction costs, plus a net gain of \$20.5 million from the sale of a power generating complex and a \$4.3 million gain on a real estate transaction. Operating profit is before U.S. and foreign income taxes and equity earnings from units not consolidated. Long term debt includes long term debt due within one year and amounting to \$48.4 million in 1984 and \$53.4 million in 1983.

Alumas Inc.: Common stock is held by Amax, Inc. (50 pct), Mitsui & Co, Ltd. (45 pct) and Nippon Steel Corp. (5 pct).

Amax Inc.: Net income for 1984 includes a \$20.8 million gain on the sale of oil and gas interests and \$205.7 million loss provision on properties and investments. Net income for 1983 includes \$3.9 million gain on the sale of a subsidiary and a \$308.8 million loss provision.

Asarco Inc.: Net loss for 1984 includes pretax charges of \$254 million from the closing of certain operations and writedown of assets. Net for 1983 includes \$20.4 million pretax gain from sale of tax benefits and a mineral provision.

Brush Wellman Inc.: Share and per share amounts are adjusted to reflect two-for one split of common stock in June 1984 and three-for two stock split in January 1983.

Cominco Ltd.: Canadian funds. Net income for 1984 includes \$6.1 million gain on sale of interest in tertiary oil recovery project and \$886,000 provision for anticipated loss from sale of interest in an associated company. Dividend and shares outstanding for 1983 restated to reflect three-for-one stock split in May 1984.

Falconbridge Ltd.: Canadian funds. Net income for 1984 includes \$51.5 million gain on sale of shares. Net loss for 1983 includes \$14.8 million gain on sale of shares by a subsidiary.

Inco Ltd.: Net sales and operating revenues exclude other income amounting to \$48.3 million in 1984 and \$21.4 million in 1983.

Kaiser Aluminum & Chemical Corp.: Net loss for 1984 includes \$7.9 million gain from continuing operations and \$61.8 million loss from discontinued operations. Results for 1983 are restated to reflect discontinued operations, including a loss of \$45.2 million on continuing operations and a \$29.7 million loss from discontinued operations.

Phelps Dodge Corp.: Operating losses for both years are stated for continuing operations. Extraordinary charge for 1984 reflects disposal of Western Nuclear, Inc., and other energy operations.

Reynolds Metals Co.: Net income for 1984 includes \$6.3 million tax benefit from tax loss carry-forward and a \$14.8 million charge for closing of a facility. Net loss for 1983 includes \$8.3 million charge relating to change in method of consolidating equity interest in a foreign subsidiary and a \$61.7 million charge relating to a closing of a facility.

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective April 8, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	186	170	195	256
Pittsburgh	217	252	246	293
Youngstown	113	113	118	123
Lake Erie	182	150	168	144
Detroit	150	151	143	178
Chicago	474	543	471	567
Cincinnati	102	107	104	126
St. Louis	77	85	73	85
Southern	209	207	219	226
Western	86	100	102	90
U.S. Production	1,796	1,878	1,839	2,099

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50%—Pickands Mather as of 1/27/81

86.9%—U.S. Steel as of 3/15/82; Cleveland-Cliffs as of 2/26/82; Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82

**Effective 8/1/83

NONFERROUS PRICES

(Effective April 8, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	49.68	49.63	4/8/85
Copper (C)	70.00-71.00	69.00-71.00	4/8/85
Lead	20.00-21.00	19.00-21.00	4/4/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	244.11	239.06	4/8/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	47.00	45.00-47.00	3/22/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.25-1.55
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$317.50
Indium, dollars per troy oz.	\$2.50
Iridium, dollars per troy oz.	\$500.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. l.o.b. N.Y.	\$309.00-315.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective April 8, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,796	1,878	23,578	26,625
Capability Utilization Rate	70.0	72.5	66.4	74.3

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base*	27.582	27.582	27.582	26.939
(¢/lb.—eff. 7/1/84)				
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$80.83	\$81.83	\$86.83	\$90.17
No. 2 bundles	\$56.50	\$56.83	\$57.50	\$60.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$83.50	\$83.50	\$92.50	\$100.50
No. 1 steel, Philadelphia	78.50	81.50	82.50	84.50
No. 1 steel, Chicago	80.50	80.50	85.50	85.50
No. 1 bundles, Detroit	76.50	76.50	87.50	89.50
Low Phos., Youngstown	68.50	73.50	72.50	96.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	79.50
No. 1 mach'y cast., Phila	98.50	98.50	98.50	100.50
No. 1 mach'y cast., Chi	111.50	111.50	111.50	114.50

*Finished Steel Composite. Weighted index of steel bars, shapes, plates, wire, rails; black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite. Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite. Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$113.00
Platinum, per troy oz.	\$270.00
Rhodium, per troy oz.	\$1,025.00
Silver ingots, per troy oz.	\$6.57
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

April 1—\$29.31	April 4—\$29.35
April 2—\$28.46	April 5—Holiday
April 3—\$29.71	

Scrap Prices Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	60 1/2	51 1/4
Yellow brass	54 3/4	49 3/4
Red brass	57 1/8	48 3/4
Comm. bronze	58	49
Mang. bronze	56	45 3/4
Free cutting rod ends	51	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	57
No. 2 copper wire	49
Light copper	40

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	45
Light copper	36
No. 1 composition	48
No. 1 comp. turnings	45
Hvy. yellow brass solids	35
Hvy. yellow brass turnings	33
Radiators	39

Aluminum		
New mixed clips	36	— 37
Old sheet	34	— 35
Old cast	34	— 35
Clean dry borings	34	— 35

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	29	— 30
Mixed L.C. clips	27	— 28
Old sheets and cast	24	— 26
Borings and turnings	22	— 23
Duraluminum clippings	25	— 26

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 38
Light copper	32	— 33
Radiators	32	— 33
No. 1 composition	40	— 41
No. 1 composition turnings	37	— 38
Cocks and faucets	30	— 32
Clean heavy yellow brass	28	— 29
Brass Pipe	28	— 29
New soft brass clippings	41	— 42

Lead

Heavy soft lead	7	— 9
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	120	— 130
Nickel rod ends	120	— 130
Nickel sheets, clips	120	— 130
Nickel turnings	40	— 45

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

MATERIALS PRICES

EFFECTIVE APRIL 8, 1985

(Effective April 8, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 83.00 to	\$ 84.00
No. 2 hvy. melting	73.00 to	74.00
No. 1 dealer bundles	95.00 to	96.00
No. 1 factory bundles (auto)	96.00 to	97.00
No. 2 bundles	56.00 to	57.00
No. 1 busheling	93.00 to	94.00
Machine shop turnings	10.00 to	11.00
Shoveling turnings	51.00 to	52.00
Low phos. punchings plate	49.00 to	50.00
Cast iron borings	603.00 to	104.00
Heavy turnings	73.00 to	74.00
No. 1 RR hvy. melting	93.00 to	94.00
Rails, 2 ft. and under	110.00 to	111.00
Scrap rails, random lgh	93.00 to	94.00
RR specialties	100.00 to	101.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	64.00 to	65.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	610.00 to	615.00
18-8 turnings	510.00 to	515.00

Chicago

No. 1 hvy. melting	\$ 80.00 to	\$ 81.00
No. 2 hvy. melting	76.00 to	77.00
No. 1 dealer bundles	95.00 to	96.00
No. 1 factory bundles (auto)	93.00 to	94.00
No. 2 dealer bundles	64.00 to	65.00
No. 1 busheling	92.00 to	93.00
Shredder scrap	92.00 to	93.00
Machine shop turnings	47.00 to	48.00
Mixed borings and turnings	46.30 to	49.00
Shoveling turnings	49.00 to	50.00
Cast iron borings	49.00 to	50.00
Low phos. large scrap	113.00 to	114.00
Low phos. punchings plate		
1 1/4 in. and heavier	127.00 to	128.00
Low phos. 2 ft. and under	121.00 to	122.00
No. 1 RR hvy. melting	85.00 to	86.00
Scrap rails, random lgh	89.00 to	90.00
Recoiler rails	103.00 to	104.00
Rails, 2 ft. and under	118.00 to	119.00
RR couplers and knuckles	99.00 to	100.00
RR car axles	120.00 to	121.00
No. 1 machinery cast	111.00 to	112.00
Cupola cast	102.00 to	103.00
Stove plate	99.00 to	100.00
Steel car wheels	102.00 to	103.00
Stainless		
18-8 bundles and solids	550.00 to	560.00
18-8 turnings	470.00 to	480.00
430 bundles and solids	135.00 to	140.00
430 turnings	105.00 to	110.00

Philadelphia

No. 1 hvy. melting	\$ 77.00 to	\$ 80.00
No. 2 hvy. melting	67.00 to	70.00
No. 1 dealer bundles	88.00 to	91.00
No. 2 dealer bundles	47.00 to	50.00
No. 1 busheling	88.00 to	91.00
Shredder scrap	95.00 to	98.00
Machine shop turnings	26.00 to	29.00
Mixed borings and turnings	26.00 to	29.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	88.00 to	91.00
Low phos. 2 ft. punchings	107.00 to	110.00
Electric furnace bundles	100.00 to	103.00
RR specialties	87.00 to	90.00
Rails, 2 ft. and under	109.00 to	112.00
Cupola cast	77.00 to	80.00
Heavy breakable cast	57.00 to	60.00
No. 1 machinery cast	97.00 to	100.00

Detroit

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 59.00 to	\$ 60.00
No. 2 hvy. melting	58.00 to	59.00
No. 1 dealer bundles	76.00 to	77.00
No. 2 bundles	36.00 to	37.00
No. 1 busheling	75.00 to	76.00
Drop forge flashings	50.00 to	51.00
Machine shop turnings	50.00 to	51.00
Mixed borings and turnings	24.00 to	25.00
Shoveling turnings	51.00 to	52.00
Cast iron borings	30.00 to	31.00
Heavy breakable cast	40.00 to	41.00
Mixed cupola cast	55.00 to	56.00
Automobile cast	79.00 to	80.00
Stainless		
18-8 bundles and solids	490.00 to	500.00
18-8 turnings	395.00 to	405.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	\$ 65.00 to	\$ 68.00
No. 2 hvy. melting	52.00 to	55.00
No. 1 dealer bundles	77.00 to	80.00
No. 2 dealer bundles	35.00 to	38.00
Machine shop turnings	11.00 to	14.00
Shoveling turnings	16.00 to	19.00
Low phos. plate	67.00 to	70.00
Electric furnace bundles	65.00 to	68.00
Galvanized bundles	57.00 to	60.00

Cleveland

No. 1 hvy. melting	\$ 65.00 to	\$ 68.00
No. 2 hvy. melting	37.00 to	40.00
No. 1 dealer bundles	74.00 to	77.00
No. 1 factory bundles	83.00 to	86.00
No. 2 bundles	31.00 to	33.00
No. 1 busheling	81.00 to	84.00
Machine shop turnings	16.00 to	19.00
Mixed borings and turnings	13.00 to	16.00
Shoveling turnings	18.00 to	21.00
Cast iron borings	15.00 to	18.00
Cut structural & plates, 2 ft. and under	112.00 to	115.00
Low phos. punchings plate	112.00 to	115.00
Drop forge flashings	43.00 to	46.00
Foundry steel, 2 ft. and under	78.00 to	81.00
No. 1 RR hvy. melting	79.00 to	82.00
Rails, 2 ft. and under	115.00 to	118.00
Rails, 18 in. and under	116.00 to	119.00
Steel axle turnings	56.00 to	59.00
Railroad cast	87.00 to	90.00
No. 1 machinery cast	102.00 to	105.00
Cupola cast	55.00 to	58.00
Stove plate	57.00 to	60.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	325.00 to	335.00
430 bundles	80.00 to	85.00

Buffalo

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 65.00 to	\$ 66.00
No. 2 hvy. melting	54.00 to	55.00
No. 1 busheling	75.00 to	76.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 bundles	43.00 to	44.00
Machine shop turnings	18.00 to	19.00
Mixed borings and turnings	18.00 to	19.00
Shoveling turnings	32.00 to	33.00
Cast iron borings	28.00 to	29.00
Low phos. plate	95.00 to	96.00
Structural and plate, 2 ft. and under	98.00 to	99.00
Rails, 2 ft. and under	100.00 to	101.00
Scrap rails, random lgh	74.00 to	75.00
No. 1 machinery cast	80.00 to	81.00
No. 1 cupola cast	60.00 to	61.00

St. Louis

No. 1 hvy. melting	\$ 65.00 to	\$ 66.00
No. 2 hvy. melting	52.00 to	53.00
Foundry steel, 2 ft.	60.00 to	61.00
No. 1 dealer bundles	65.00 to	66.00
No. 2 bundles	47.00 to	48.00
Machine shop turnings	18.00 to	19.00
Shoveling turnings	23.00 to	24.00
Cast iron borings	28.00 to	29.00
No. 1 RR hvy. melting	66.00 to	67.00
Rails, random length	66.00 to	67.00
Rails, 18 in. and under	82.00 to	83.00
RR specialties	81.00 to	82.00
Cupola cast	76.00 to	77.00
Heavy breakable cast	54.00 to	55.00
Stove plate	91.00 to	92.00
Steel car wheels	96.00 to	97.00
Recoiler rails	78.00 to	79.00
Unstripped motor blocks	63.00 to	64.00

Birmingham

No. 1 hvy. melting	\$ 73.00 to	\$ 74.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	77.00 to	78.00
No. 2 bundles	50.00 to	51.00
No. 1 busheling	77.00 to	78.00
Shredder scrap	102.00 to	103.00
Machine shop turnings	102.00 to	103.00
Shoveling turnings	29.00 to	30.00
Cast iron borings	39.00 to	40.00
Electric furnace bundles	74.00 to	75.00
Elec. furnace, 3 ft. & under	74.00 to	75.00
Structural and plate, 2 ft.	100.00 to	101.00
Structural and plate, 4 ft.	94.00 to	95.00
No. 1 RR hvy. melting	94.00 to	95.00
Scrap rails, random lgh	90.00 to	91.00
Rails, 2 ft. and under	105.00 to	106.00
Angles and splice bars	92.00 to	93.00
No. 1 cupola cast	87.00 to	88.00
Unstripped motor blocks	75.00 to	76.00

Cincinnati

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 53.00 to	\$ 54.00
No. 2 hvy. melting	52.00 to	53.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	27.00 to	28.00
Machine shop turnings	6.00 to	7.00
Shoveling turnings	8.00 to	9.00
Cast iron borings	19.00 to	20.00
Low phos. 18 in. and under	85.00 to	86.00
Rails, random length	64.00 to	65.00
Rails, 2 ft. and under	79.00 to	80.00
No. 1 cupola cast	60.00 to	61.00
Heavy breakable cast	26.00 to	27.00
Drop broken cast	76.00 to	77.00

New York

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 47.00 to	\$ 48.00
No. 2 hvy. melting	38.00 to	39.00
No. 1 dealer bundles	23.00 to	27.00
Mixed borings and turnings	11.00 to	13.00
Machine shop turnings	6.00 to	7.00
Shoveling turnings	14.00 to	15.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	505.00 to	525.00
18-8 turnings	415.00 to	425.00
430 prepared solids	90.00 to	110.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 55.00 to	\$ 57.00
No. 2 hvy. melting	45.00 to	47.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	33.00 to	35.00
No. 1 busheling	68.00 to	70.00
Shredder scrap	65.00 to	67.00
Machine shop turnings	10.00 to	12.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	79.00 to	84.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	\$ 44.00 to	\$ 45.00
No. 2 hvy. melting	38.00 to	40.00
No. 1 dealer bundles	35.00 to	37.00
No. 2 dealer bundles	20.00 to	22.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	61.00 to	63.00

Los Angeles

No. 1 hvy. melting	\$ 47.00 to	\$ 49.00
No. 2 hvy. melting	40.00 to	42.00
No. 1 dealer bundles	38.00 to	40.00
No. 2 dealer bundles	20.00 to	22.00
Machine shop turnings	13.00 to	14.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	74.00 to	76.00
Elec. furnace, 1 ft. and under (foundry)	75.00 to	77.00

Seattle

No. 1 hvy. melting	66.00 to	68.00
No. 2 hvy. melting	57.00 to	59.00
No. 1 dealer bundles	40.00 to	42.00
No. 2 bundles	92.00 to	93.00
Mixed yard cast	82.00 to	84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 86.00 to	\$ 88.00
No. 2 hvy. melting cut 2 ft. and under	78.00 to	80.00
No. 1 dealer bundles	84.00 to	86.00
No. 2 bundles	62.00 to	64.00
Mixed steel scrap	60.00 to	62.00
Bush, new fact, prep'd	86.00 to	88.00
Bush, new fact, unprep'd	75.00 to	77.00
Machine shop turnings	37.00 to	39.00
Short steel turnings	37.00 to	39.00
Mixed borings and turnings	25.00 to	27.00
Cast scrap	95.00 to	97.00

Houston

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 75.00 to	\$ 76.00
No. 2 hvy. melting	61.00 to	62.00
No. 1 dealer bundles	46.00 to	47.00
No. 2 bundles	17.00 to	18.00
Machine shop turnings	36.00 to	37.00
Crushed turnings	83.00 to	84.00
Shredder scrap	103.00 to	104.00
Cut structural plate, 2 ft. and under	86.00 to	87.00
Cut structural plate, 5 ft. and under	86.00 to	87.00
Unstripped motor blocks	60.00 to	61.00
Cupola cast	67.00 to	68.00

STEEL PRICES

PRODUCER KEY

With Principal Offices

A7 Armco Inc., Middletown, Ohio

A8 Atlantic Steel Co., Atlanta, Ga.

A11 Atlantic Wire Co., Branford, Conn.

B1 Baran Drawn Steel Corp., Toledo, Ohio

B3 Bethlehem Steel Corp., Bethlehem, Pa.

B4 Blair Strip Steel Co., New Castle, Pa.

B5 Bliss & Laughlin Steel Co.,
Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.

C10 Copperweld Steel Co., Warren, Ohio

C16 Connors Steel Co., Birmingham, Ala.

C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Div., National

Steel Corp., Granite City, Ill.

G3 Great Lakes Steel Div., National

Steel Corp., Ecorse, Mich.

G4 Greer Steel Co., Dover, Ohio

G5 Green River Steel Corp., Owensboro, Ky.

G6 Gibraltar Steel Corp., Buffalo, N. Y.

G7 Georgetown Steel Corp.,
Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.

I3 Inland Steel Co., Chicago

I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.

J3 Jones & Laughlin Steel Corp., Pittsburgh

J4 Joslyn Mfg. & Supply Co., Chicago

J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.

K3 Kentucky Electric Steel Co., Ashland, Ky.

K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago

L3 Lone Star Steel Co., Dallas

L4 Lukens, Inc., Coatesville, Pa.

M2 McLouth Steel Products Corp., Detroit

M8 Mill Strip Products Div., National Steel

Service Center, National Steel Corp.

M9 Mottrop Steel Products Co., Beaver Falls, Pa.

M11 Midwest Steel Div., National Steel

Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston

N4 Northwestern Steel & Wire Co.,
Sterling, Ill.

N6 Northwest Steel Rolling Mills, Seattle

N9 Nelsn Steel & Wire Co., Chicago

N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.

P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland

R4 Ramco Steel Co., Buffalo, N. Y.

R5 Roblin Steel Corp., North Tonawanda, N. Y.

R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.

S7 Stanley Works, New Britain, Conn.

S8 Superior Drawn Steel Co., Monaca, Pa.

S10 Seneca Steel Corp., Buffalo, N. Y.

S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio

T5 Timken Co., Steel Division, Canton, Ohio

T7 Texas Steel Co., Fort Worth, Tex.

T9 Triumph Electro Corp., Chicago

T10 Tennessee Forging Steel Corp.,
Harriman, Tenn.

T11 Teledyne Columbia-Summerill,
Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh

W3 Weirton Steel Corp., Weirton, W. Va.

W5 Wheeling-Pittsburgh Steel Corp.

W7 Wilson Steel & Wire Co., Chicago

W10 Wyckoff Steel Div., Ampco-Pittsburgh
Corp., Pittsburgh

W14 Whittar Steel Strip Div., Whittar
Industries, Ltd., Detroit

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

	Cities* City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot Rolled (10 ga)	Cold Rolled (20 ga)	Galvanized (16 ga)	Hot Rolled Strip	Plates	Standard Shapes	Hot Rolled (Hot Short)	Cold Finished	Hot Rolled A502 As Rolled	Hot Rolled A502 Annealed	Cold Drawn A502 As Rolled	Cold Drawn A502 Annealed
G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.	Atlanta	26.95	32.83	33.53	31.34	25.79	22.76	19.99	31.88	34.34	50.60	69.58	73.19
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.	Baltimore	26.90	30.72	35.71	36.82	32.66	28.80	22.60	36.40	51.69	56.95	63.60	69.98
G4 Greer Steel Co., Dover, Ohio	Birmingham	25.47	32.35	35.27	31.94	25.40	23.63	21.20	32.24	49.31	58.90	68.10	74.43
G5 Green River Steel Corp., Owensboro, Ky.	Boston	34.94	40.19	45.64	47.54	33.25	30.06	23.88	35.93	41.98	46.00	54.65	58.83
G6 Gibraltar Steel Corp., Buffalo, N. Y.	Buffalo	31.10	35.68	41.89	40.15	30.60	26.15	20.15	33.05	41.05	43.95	49.30	56.61
G7 Georgetown Steel Corp., Georgetown, S.C.	Chicago	28.74	35.76	37.88	29.14	23.53	20.19	18.12	27.92	32.30	41.66	46.98	52.91
H1 Hercules Drawn Steel Corp., Livonia, Mich.	Cincinnati	29.70	35.07	37.78	29.88	24.42	20.21	18.50	29.32	34.22	42.79	47.25	52.89
I2 Ingersoll Steel Div., Newcastle, Ind.	Cleveland	28.48	34.22	37.48	36.74	23.60	23.58	18.89	31.34	38.19	42.83	47.48	54.28
I3 Inland Steel Co., Chicago	Denver	31.44	38.19	36.22	37.09	27.40	24.56	20.39	39.80	50.55	57.95	65.95	70.19
I4 Interlake Steel Corp., Chicago	Detroit	29.44	35.48	38.26	29.03	24.45	20.78	17.85	29.33	34.09	42.46	47.29	53.49
J2 Jessop Steel Corp., Washington, Pa.	Houston	27.67	28.71	31.69	39.21	26.73	26.27	21.60	40.15	45.96	52.87	58.95	66.14
J3 Jones & Laughlin Steel Corp., Pittsburgh	Kansas City	30.72	36.98	39.70	34.01	27.10	23.68	18.19	34.15	39.60	45.40	49.73	54.87
J4 Joslyn Mfg. & Supply Co., Chicago	Los Angeles	27.01	31.33	37.84	34.31	28.39	32.31	26.81	38.05	50.88	57.10	63.15	70.64
J5 Judson Steel Corp., Emeryville, Calif.	Memphis	24.31	32.51	35.34	31.89	26.17	21.51	20.49	34.05	36.78	49.96	59.80	69.44
K2 Keystone Consolidated Industries, Inc.	Milwaukee	29.00	34.67	37.64	31.22	24.52	21.64	18.11	28.10	33.82	42.06	46.47	52.90
K3 Kentucky Electric Steel Co., Ashland, Ky.	New York	32.47	38.99	42.55	43.38	32.66	25.31	21.35	36.35	42.26	46.93	51.84	56.22
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.	Philadelphia	28.10	38.99	41.23	43.50	31.05	27.15	19.28	32.14	42.50	47.75	55.07	60.50
L2 La Salle Steel Co., Chicago	Pittsburgh	35.27	40.97	45.23	43.45	37.60	30.44	21.58	30.44	38.43	44.64	49.90	54.10
L3 Lone Star Steel Co., Dallas	Portland	28.96	32.08	36.73	36.93	32.88	34.78	27.16	44.85	49.78	57.74	70.44	-----
L4 Lukens, Inc., Coatesville, Pa.	San Francisco	26.94	31.55	37.04	34.48	27.78	30.19	26.07	38.70	50.70	57.69	63.90	70.05
M2 McLouth Steel Products Corp., Detroit	Seattle	23.61	30.12	36.65	32.95	22.02	27.32	26.05	39.14	53.03	61.70	69.75	74.63
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.	Spokane	21.21	30.42	35.65	38.02	35.00	33.77	22.26	43.01	43.20	47.52	-----	58.32
M9 Mottrop Steel Products Co., Beaver Falls, Pa.	St. Louis	29.11	34.60	37.31	34.59	23.89	21.73	18.44	32.28	38.12	43.51	47.85	53.69
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.	St. Paul	26.87	33.61	35.61	38.36	23.81	22.48	17.99	32.18	37.52	42.72	47.09	53.31

Base Quantities: All HRI products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv sheet—16 ga x 36—120; Hot-rolled strip—1/8" x 1"; Plate 1/4" x 84"; Shapes—4 Beams 6 x 12.5; Hot-rolled bar—Round 3/4-2 1/2 16; Cold finished bar—C 1018—1" round; Alloy bar—Hot-rolled 8620—1-5/8" round; Cold drawn—1" round; Hot-rolled 4140—1-5/8" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

STEEL PRICES

Codes identify Producers listed on p. 107. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)	
Carbon Re-rolling, Midwest	
W5	\$366.00
N4	\$366.00
West	
C6	\$346.00
Carbon Forging, East	
B3(2)	\$473.00
C10, U1	\$473.00
R3	\$453.00
Midwest	
R3, W5	\$453.00
U1	\$473.00
S1, I3	\$473.00
C10	\$473.00
K2	\$473.00
West	
C6	\$420.00
Alloy, East	
R3	\$492.00
B3	\$512.00
U1, C10	\$512.00
Midwest	
W5	\$492.00
U1, I3	\$512.00
C10	\$512.00
R3	\$472.00
S1	\$512.00
West	
C6	\$469.00

Structurals

Carbon, East	
B3	22.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3, T10, N4	23.90
South	
C16	23.90
T10	22.90
High-Strength, Low Alloy, East	
B3	22.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
South	
C16	23.90
Wide Flange, Carbon, East	
B3	22.90
U1	22.75
J3	23.90
Midwest	
U1	22.75
N4	23.90
I3	23.90
Wide Flange, High-Strength-Low Alloy, East	
U1	24.30
Midwest	
U1	24.30

Strip

Hot-Rolled, Carbon, Cut II edge—all widths, East	
U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1	23.75
U1, A7	23.75
I3, B3	23.75
M2	22.05
R3	22.05

South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
S10	29.60
P15	24.80
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05
High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge, All widths, (plus extras)*	
Midwest	
M2, R3	22.05
W3, J3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge	
Midwest	
S1	37.05
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	26.10
I4	25.20
Alloy, Cold-Rolled, East (plus extras)*	
E4, M8	43.35
B4	49.75
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Hysol)	
East	
B3	23.75
J3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5	23.75
S1, B3	23.75
I3, A7	23.75
West	
U1	24.25
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2)	28.15
J3	26.15
U1	28.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.85
J3	26.15
D1	26.15
U1, W5	28.15
S1, B3	28.15
I3, A7	28.15
West	
U1	28.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	30.30
U1	30.30
Midwest	
J3, D1, W3	28.00
R3, Y1	28.00
G2, M11	30.00
U1, W5	30.30
S1, I3, A7	30.30
West	
U1	30.80
South	
R3	28.00
Enameling, Midwest	
U1, S1	29.65
I3, A7	29.65
J3	27.65
Lamp-Term, Midwest	
W5, A7, U1	31.65

R3	29.35
----	-------

Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
East	per base box
J3	26.29
U1	28.99
Midwest	
U1	28.99
J3	26.29
M11	27.54
W3	26.29
W5	28.99
West	
U1	29.49
South	
U1	28.99
Double Reduced (55 lb)*	
Midwest	
M11	21.95
J3	21.49
U1	23.38
W3	21.49
W5	23.38
West	
U1	23.88
South	
U1	23.38
Black Plate	
Single Reduced (70 lb)*	
East	
B3	24.81
Midwest	
J3, W3	24.01
I3	24.57
W5	25.55
U1	26.27
M11	26.27
West	
U1	26.27
Double Reduced (55 lb)	
East	
B3	20.49
Midwest	
W5, M11, U1	20.49
J3	18.93
W3	18.93
West	
U1	20.49
South	
U1	20.49
*75 lb—base weight extra 69¢	
**50 lb—base weight extra \$1.40	

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3, R5	25.80
J3	25.80
U1, C10, B3(3)	27.05
Midwest	
I4	26.00
U1, I3	27.05
R3, T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
T11, S8	31.00
J3(4), L2	31.00
M8, W10	31.00
N1	24.475

R4, B4	33.25
C10	31.00
Midwest	
W10, R3	33.25
J3	31.00
B1	33.45
L2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
West	
R3	37.15
South	
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
R5, K3	27.95
R3, J3	27.95
U1, B3(2), C10	29.20
Midwest	
R3	27.95
I3, C10, U1	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold-Drawn, East	
L2	35.20
R3, N1	37.90
R4	37.10
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
Midwest	
R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
L2	34.85
B5, M9	38.60
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3	23.25
L4, U1	25.75
P2	23.25
J3	26.75
Midwest	
B3	23.25
I3	25.75
J3, A7	22.80
U1, I4, S1	25.75
R3	26.75
West	
U1	25.75
O2	23.00
South	
R3	25.75
U1	25.75
Alloy East	
B3	31.05
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	31.05
I4, U1	33.55
West	
O2	31.00
South	
U1	33.55

Wire

Carbon-Steel Wire, East	
B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

CAPITAL SPENDING KEEPS DURABLE ORDERS ON TRACK

Despite some obvious negatives in new factory orders for February, the economy is picking up steam.

At first glance, the figures show a 0.2 pct drop—not a positive—but a second look shows a robust 27.5 pct jump in non-defense capital goods orders, a key indicator of business investment plans. In January that figure was down 15.2 pct. At that time government analysts predicted a pickup. The February statistics show a whopping 154 pct increase in orders for computers and miscellaneous office equipment.

The overall 0.2 pct decline was attributed to a 43.7 pct drop in demand for military hardware, a consistently fluctuating category. Absent the military quotient, orders for manufactured goods increased 2.1 pct, the Commerce Department said.

Robert Ortner, the Commerce Department's chief economist, said the jump in spending for computers is not likely to recur in coming months. As a result, business capital spending will tail off slightly.

Orders for durable goods—including machinery and major consumer purchases—dropped 1.2 pct in February. Changes in durable goods new orders in February were dominated by a few large offsetting movements in the machinery and transportation equipment industries. Large increases in office and computing equipment and commercial aircraft were offset by declines in defense communications equipment, defense aircraft and motor vehicles and parts.

Commerce Secretary Malcolm Baldrige said the orders results coupled with the latest figures on the government's index of leading indicators are a sign that capital spending this year will again prove to be a driving force for expansion of the economy. The index of leading indicators rose 0.7 pct in February.

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted Source: U.S. Dept. of Commerce		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total*	4th Qtr.	\$321.4	\$313.1	\$283.9
Manufacturing, Total*	4th Qtr.	139.0	134.5	116.4
Manufacturing, Durable Goods*	4th Qtr.	67.5	65.4	54.9
Mining Industry*	4th Qtr.	12.9	12.6	12.4
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	February	103.7	105.0	101.8
Shipments	February	102.3	104.0	96.0
Inventories	February	191.5	191.3	172.9
Unfilled Orders	February	347.5	346.1	335.0
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	February	29.5	23.1	26.9
Capital Goods Producers, Defense Industries	February	5.5	9.8	7.5
Primary Metals, Total	February	10.2	11.1	11.2
Steel (SIC 331)	February	4.5	4.8	4.8
Iron & Steel Castings (SIC 332)	February	1.1	1.3	1.3
Nonferrous Metals	February	4.6	5.0	5.1
Nonelectrical Mach.-Equip. Industries, Total	February	20.4	15.1	17.1
Engines & Turbines	February	1.2	0.9	1.2
Farm Machinery & Equipment (Shipments)	February	0.7	0.7	1.0
Construction, Mining & Mat. Hdq. Equip	February	2.3	2.6	2.6
General Industrial Machinery	February	1.3	1.3	1.3
Fluid Power Equipment** (Index-1972=100)	February	276.0	298.0	318.0
Metalworking Machinery	February	1.0	0.9	0.6
Machine Tools, Total (\$Mill., Unadjusted)***	February	237.6	211.9	202.3
Machine Tools, Metalcutting***	February	163.7	138.2	132.6
Machine Tools, Metalforming***	February	73.9	73.7	69.7
Electrical Mach. & Equip. Industries, Total	February	15.0	18.3	15.9
Elec. Transmission Equip. & Ind. Apparatus	February	2.0	2.1	2.0
Household Appliances	February	1.3	1.5	1.3
Communication Equipment	February	5.2	7.4	5.3
Transportation Equip. Industrial, Total	February	26.0	27.4	27.1
Motor Vehicles & Parts (Shipments)	February	18.4	19.5	16.7
Aircraft, Missiles & Parts	February	6.2	6.7	7.6
Shipbuilding & Military Tanks	February	0.4	0.5	1.9
Fabricated Metal Products, Total	February	13.0	13.1	11.4
Instruments, Total	February	4.8	4.8	4.2

*Est.—Commerce Dept. **Source: National Fluid Power Assn. ***Source: NMTBA.

C2150-9

MANUFACTURING MANAGEMENT

NUMERICAL CONTROL: AN IMPORTANT LINK TO THE FACTORY OF THE FUTURE
TODAY'S MANAGER—PART TWO IN A SERIES:
THE ASSAULT ON THE RANKS OF THE MIDDLE MANAGER
THE CROWDED SKIES OF AIRCRAFT PRODUCTION

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ONE OF THE ABC PUBLISHING COMPANIES

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective April 22, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	201	198	192	267
Pittsburgh	236	240	245	292
Youngstown	112	112	111	118
Lake Erie	170	169	170	147
Detroit	140	146	149	186
Chicago	508	510	539	577
Cincinnati	100	107	92	121
St. Louis	65	65	84	85
Southern	226	230	206	233
Western	83	84	99	90
U.S. Production	1,841	1,861	1,887	2,127

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.05-31.53**

*80.50%—Pitkin's Mather as of 1/27/81.

86.9%—U.S. Steel as of 3/15/82. Cleveland Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

**Effective 8/1/83.

NONFERROUS PRICES

(Effective April 22, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	50.40	50.21	4/22/85
Copper (C)	70.00-72.00	70.50-72.00	4/19/85
Lead	20.00-21.00	21.00	4/11/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	246.89	246.85	4/22/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	45.00-47.00	45.00	3/22/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.25-1.55
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$327.75
Indium, dollars per troy oz.	\$2.50
Iridium, dollars per troy oz.	\$500.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$303.00-312.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective April 22, 1985)

U.S. Steel Production	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,841	1,861	27,323	30,840
Capability Utilization Rate	71.8	72.5	67.3	75.2

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	26.939
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$77.50	\$80.50	\$86.83	\$90.17
No. 2 bundles	\$55.17	\$55.50	\$57.50	\$60.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$79.50	\$83.50	\$92.50	\$100.50
No. 1 steel, Philadelphia	73.50	78.50	82.50	84.50
No. 1 steel, Chicago	79.50	79.50	85.50	85.50
No. 1 bundles, Detroit	76.50	76.50	87.50	89.50
Low Phos., Youngstown	58.50	68.50	78.50	96.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	79.50
No. 1 mach'y cast., Phila	93.50	93.50	98.50	100.50
No. 1 mach'y cast., Chi	111.50	111.50	111.50	117.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$113.00
Platinum, per troy oz.	\$285.00
Rhodium, per troy oz.	\$1,025.00
Silver ingots, per troy oz.	\$6.415
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

April 15—\$47.61	April 18—\$47.70
April 16—\$54.44	April 19—\$45.17
April 17—\$51.81	

Scrap Prices Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	64 1/8	55 1/4
Yellow brass	57	49 3/4
Red brass	60 3/8	50 1/4
Comm. bronze	61 1/2	50 1/2
Mang. bronze	51	48
Free cutting rod ends	50	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	57
No. 2 copper wire	48
Light copper	39

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	44
Light copper	35
No. 1 composition	50
No. 1 comp. turnings	47
Hvy. yellow brass solids	35
Hvy. yellow brass turnings	33
Radiators	39

Aluminum		
New mixed clips	34	— 35
Old sheet	32	— 33
Old cast	32	— 33
Clean dry borings	33	— 34

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	29	— 30
Mixed L.C. clips	27	— 28
Old sheets and cast	24	— 26
Burings and turnings	22	— 23
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 38
Light copper	32	— 33
Radiators	31	— 32
No. 1 composition	40	— 41
No. 1 composition turnings	37	— 38
Cocks and faucets	30	— 32
Clean heavy yellow brass	28	— 29
Brass Pipe	28	— 29
New soft brass clippings	41	— 42

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	120	— 130
Nickel rod ends	120	— 130
Nickel sheets, clips	120	— 130
Nickel turnings	40	— 45

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

EFFECTIVE APRIL 22, 1985

(Effective April 22, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 79.00 to	\$ 80.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	91.00 to	92.00
No. 1 factory bundles (auto)	92.00 to	93.00
No. 2 bundles	56.00 to	57.00
No. 1 busheling	91.00 to	92.00
Machine shop turnings	10.00 to	11.00
Shoveling turnings	51.00 to	52.00
Cast iron borings	49.00 to	50.00
Low phos. punchings plate	97.00 to	98.00
Heavy turnings	69.00 to	70.00
No. 1 RR hvy. melting	89.00 to	90.00
Rails, 2 ft. and under	108.00 to	109.00
Scrap rails, random lgh	91.00 to	92.00
RR specialties	96.00 to	97.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	64.00 to	65.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	610.00 to	615.00
18-8 turnings	510.00 to	515.00

Chicago

No. 1 hvy. melting	\$ 79.00 to	\$ 80.00
No. 2 hvy. melting	75.00 to	76.00
No. 1 dealer bundles	93.00 to	94.00
No. 1 factory bundles (auto)	93.00 to	94.00
No. 2 dealer bundles	62.00 to	63.00
No. 1 busheling	91.00 to	92.00
Shredder scrap	92.00 to	93.00
Machine shop turnings	46.00 to	47.00
Mixed borings and turnings	47.00 to	48.00
Shoveling turnings	48.00 to	49.00
Cast iron borings	47.00 to	48.00
Low phos. large crop	113.00 to	114.00
Low phos. punchings plate		
1 1/4 in. and heavier	127.00 to	128.00
Low phos. 2 ft. and under	121.00 to	122.00
No. 1 RR hvy. melting	84.00 to	85.00
Scrap rails random lgh	88.00 to	89.00
Roller rails	103.00 to	104.00
Rails, 2 ft. and under	117.00 to	118.00
RR couplers and knuckles	98.00 to	99.00
RR car axles	120.00 to	121.00
No. 1 machinery cast	111.00 to	112.00
Cupola cast	102.00 to	103.00
Stove plate	99.00 to	100.00
Steel car wheels	102.00 to	103.00
Stainless		
18-8 bundles and solids	550.00 to	560.00
18-8 turnings	470.00 to	480.00
430 bundles and solids	135.00 to	140.00
430 turnings	105.00 to	110.00

Philadelphia

No. 1 hvy. melting	\$ 72.00 to	\$ 75.00
No. 2 hvy. melting	62.00 to	65.00
No. 1 dealer bundles	84.00 to	87.00
No. 2 dealer bundles	45.00 to	48.00
No. 1 busheling	84.00 to	87.00
Shredder scrap	87.00 to	90.00
Machine shop turnings	26.00 to	29.00
Mixed borings and turnings	26.00 to	29.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	84.00 to	87.00
Low phos. 2 ft. punchings	102.00 to	105.00
Electric furnace bundles	100.00 to	103.00
RR specialties	84.00 to	87.00
Rails, 2 ft. and under	105.00 to	108.00
Cupola cast	77.00 to	80.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	92.00 to	95.00

Detroit

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 59.00 to	\$ 60.00
No. 2 hvy. melting	58.00 to	59.00
No. 1 dealer bundles	76.00 to	77.00
No. 2 bundles	36.00 to	37.00
No. 1 busheling	75.00 to	76.00
Drop forge flashings	50.00 to	51.00
Machine shop turnings	50.00 to	51.00
Mixed borings and turnings	24.00 to	25.00
Shoveling turnings	51.00 to	52.00
Cast iron borings	30.00 to	31.00
Heavy breakable cast	40.00 to	41.00
Mixed cupola cast	55.00 to	56.00
Automobile cast	79.00 to	80.00
Stainless		
18-8 bundles and solids	500.00 to	510.00
18-8 turnings	395.00 to	405.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	\$ 55.00 to	\$ 58.00
No. 2 hvy. melting	42.00 to	45.00
No. 1 dealer bundles	67.00 to	70.00
No. 2 dealer bundles	50.00 to	53.00
Machine shop turnings	11.00 to	14.00
Shoveling turnings	16.00 to	19.00
Low phos. plate	57.00 to	60.00
Electric furnace bundles	55.00 to	58.00
Galvanized bundles	47.00 to	50.00

Cleveland

No. 1 hvy. melting	\$ 55.00 to	\$ 58.00
No. 2 hvy. melting	32.00 to	35.00
No. 1 dealer bundles	64.00 to	67.00
No. 1 factory bundles	59.00 to	62.00
No. 2 bundles	30.00 to	33.00
No. 1 busheling	56.00 to	59.00
Machine shop turnings	14.00 to	16.00
Mixed borings and turnings	13.00 to	16.00
Shoveling turnings	18.00 to	21.00
Cast iron borings	15.00 to	18.00
Cut structural & plates,		
2 ft. and under	97.00 to	100.00
Low phos. punchings plate	97.00 to	100.00
Drop forge flashings	43.00 to	46.00
Foundry steel, 2 ft. & under	78.00 to	81.00
No. 1 RR hvy. melting	79.00 to	82.00
Rails, 2 ft. and under	115.00 to	118.00
Rails, 18 in. and under	114.00 to	119.00
Steel axle turnings	56.00 to	59.00
Railroad cast	87.00 to	90.00
No. 1 machinery cast	102.00 to	105.00
Cupola cast	55.00 to	58.00
Stove plate	57.00 to	60.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	325.00 to	335.00
430 bundles	80.00 to	85.00

Buffalo

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 61.00 to	\$ 62.00
No. 2 hvy. melting	50.00 to	51.00
No. 1 busheling	72.00 to	73.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	37.00 to	38.00
Machine shop turnings	18.00 to	19.00
Mixed boring and turnings	18.00 to	19.00
Shoveling turnings	32.00 to	33.00
Cast iron borings	28.00 to	29.00
Low phos. plate	88.00 to	89.00
Structural and plate,		
2 ft. and under	89.00 to	90.00
Rails, 2 ft. and under	91.00 to	92.00
Scrap rails, random lgh	70.00 to	71.00
No. 1 machinery cast	76.00 to	77.00
No. 1 cupola cast	58.00 to	59.00

St. Louis

No. 1 hvy. melting	\$ 63.00 to	\$ 66.00
No. 2 hvy. melting	52.00 to	53.00
Foundry steel, 2 ft.	60.00 to	61.00
No. 1 dealer bundles	65.00 to	66.00
No. 2 bundles	47.00 to	48.00
Machine shop turnings	17.00 to	18.00
Shoveling turnings	23.00 to	24.00
Cast iron borings	28.00 to	29.00
No. 1 RR hvy. melting	66.00 to	67.00
Rails, random length	66.00 to	67.00
Rails, 18 in. and under	82.00 to	83.00
RR specialties	81.00 to	82.00
Cupola cast	76.00 to	77.00
Heavy breakable cast	54.00 to	55.00
Stove plate	91.00 to	92.00
Steel car wheels	96.00 to	97.00
Rolling rails	78.00 to	79.00
Unstripped motor blocks	63.00 to	64.00

Birmingham

No. 1 hvy. melting	\$ 73.00 to	\$ 74.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 bundles	48.00 to	49.00
No. 1 busheling	74.00 to	75.00
Shredder scrap	97.00 to	98.00
Machine shop turnings	27.00 to	28.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	37.00 to	38.00
Electric furnace bundles	70.00 to	71.00
Elec. furnace, 3 ft. & under	70.00 to	71.00
Structural and plate, 2 ft.	97.00 to	98.00
Structural and plate, 4 ft.	92.00 to	93.00
No. 1 RR hvy. melting	92.00 to	93.00
Scrap rails, random lgh	84.00 to	85.00
Rails, 2 ft. and under	101.00 to	102.00
Angles and splice bars	90.00 to	91.00
No. 1 cupola cast	67.00 to	68.00
Unstripped motor blocks	75.00 to	76.00

Cincinnati

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 51.00 to	\$ 52.00
No. 2 hvy. melting	46.00 to	47.00
No. 1 dealer bundles	57.00 to	58.00
No. 2 bundles	25.00 to	26.00
Machine shop turnings	5.00 to	6.00
Shoveling turnings	7.00 to	8.00
Cast iron borings	16.00 to	17.00
Low phos. 18 in. and under	83.00 to	84.00
Rails, random length	62.00 to	63.00
Rails, 2 ft. and under	77.00 to	78.00
No. 1 cupola cast	55.00 to	60.00
Heavy breakable cast	25.00 to	26.00
Drop broken cast	73.00 to	74.00

New York

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 47.00 to	\$ 48.00
No. 2 hvy. melting	38.00 to	39.00
No. 2 dealer bundles	23.00 to	27.00
Mixed borings and turnings	11.00 to	13.00
Machine shop turnings	6.00 to	7.00
Shoveling turnings	14.00 to	15.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	505.00 to	525.00
18-8 turnings	405.00 to	425.00
430 prepared solids	90.00 to	110.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 55.00 to	\$ 57.00
No. 2 hvy. melting	45.00 to	47.00
No. 1 dealer bundles	58.00 to	59.00
No. 2 bundles	33.00 to	35.00
No. 1 busheling	68.00 to	70.00
Shredder scrap	65.00 to	67.00
Machine shop turnings	10.00 to	12.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	79.00 to	84.00
Mixed cupola cast	46.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	\$ 42.00 to	\$ 44.00
No. 2 hvy. melting	36.00 to	38.00
No. 1 dealer bundles	31.00 to	35.00
No. 2 dealer bundles	19.00 to	21.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	81.00 to	83.00

Los Angeles

No. 1 hvy. melting	\$ 45.00 to	\$ 47.00
No. 2 hvy. melting	38.00 to	40.00
No. 1 dealer bundles	36.00 to	38.00
No. 2 dealer bundles	19.00 to	21.00
Machine shop turnings	13.00 to	14.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under		
(foundry)	74.00 to	76.00
No. 1 cupola cast	75.00 to	77.00

Seattle

No. 1 hvy. melting	64.00 to	66.00
No. 2 hvy. melting	55.00 to	57.00
No. 2 bundles	38.00 to	40.00
No. 1 cupola cast	92.00 to	93.00
Mixed yard cast	82.00 to	84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 86.00	
No. 2 hvy. melting, cut 2 ft. and under	78.00	
No. 1 dealer bundles	84.00	
No. 2 bundles	62.00	
Mixed steel scrap	60.00	
Bush. new fact. prep'd	86.00	
Bush. new fact. unprep'd	75.00	
Machine shop turnings	37.00	
Short steel turnings	37.00	
Mixed borings and turnings	25.00	
Cast scrap	95.00	

Houston

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 75.00 to	\$ 76.00
No. 2 hvy. melting	61.00 to	62.00
No. 2 bundles	46.00 to	47.00
Machine shop turnings	17.00 to	18.00
Crushed turnings	34.00 to	35.00
Shredder scrap	83.00 to	84.00
Cut structural plate, 2 ft. and under	103.00 to	104.00
Cut structural plate, 5 ft. and under	86.00 to	87.00
Unstripped motor blocks	60.00 to	61.00
Cupola cast	87.00 to	88.00

PRODUCER PRICES POST A MODERATE RISE

The nation's huge trade deficit and strong dollar are affecting its manufacturing sector. One result is relatively stable producer prices.

March producer prices edged up 0.2 pct, following a 0.1 pct drop in February and no change in January. Inflation at the wholesale level has risen only 0.3 pct in the last year, the smallest gain in 20 years, the U.S. Commerce Department said.

Oversupplies of oil and food continue to be the main stabilizing influences on the overall level of prices. As shown by the data at right, 16 of the 22 categories covered rose in March. Among the notable declines, however, was a drop of 0.1 pct in auto prices.

Based on the first quarter trend, analysts believe there is little reason to expect any acceleration of inflation in the prices of goods. Prices of intermediate goods, those which still require some processing, and of crude goods both declined in March for the third consecutive month.

Capital equipment prices continued to rise, moving up 2.5 pct before seasonal adjustment and 0.4 pct after seasonal variations are taken into account, Commerce said.

In the durable manufacturing materials category, decreases for copper, lead, gold and silver were partly offset by higher prices for zinc. For crude goods, ferrous scrap prices turned up after falling in February and a decrease registered for aluminum base scrap was smaller than in the previous month. Prices decreased for copper base scrap.

Meanwhile, domestic inventories grew 0.4 pct in February, the latest month for which data is available. Economists are watching inventories to see if slow demand is creating backed-up supplies large enough to shut down new orders. Currently, most analysts are not yet concerned about inventory overhang.

Latest Month Covered: March 1985

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	395.9	+ 1.5	+ 3.7
Metal Forming Machine Tools	432.9	+ 0.2	+ 3.1
Agricultural Machinery & Equip.	339.0	+ 0.2	+ 1.8
Construction Machinery & Equip.	361.8	0	+ 1.8
Industrial Process Furnace & Ovens	383.6	+ 0.3	+ 3.5
Industrial Material Handling Equip.	294.0	+ 0.4	+ 2.3
Pumps, Compressors & Allied Equip.	355.8	+ 0.8	+ 2.3
Fluid Power Equip. (Dec. 1970 = 100)	263.0	+ 0.2	+ 2.3
Mechanical Power Transmission Equip.	335.3	+ 0.1	+ 4.0
Automobiles	227.0	- 0.1	+ 2.2
Motor Trucks—Light	296.2	0	+ 5.3
Motor Trucks—Heavy	332.3	+ 0.2	+ 1.8
Railroad Equipment	362.7	+ 0.3	+ 3.0
Fabricated Metal Structural Products	314.3	+ 0.3	+ 1.9
Electric Motors	350.1	+ 0.5	+ 3.6
Valves & Fittings (Dec. 1982 = 100)	104.3	+ 0.2	+ 3.2
Ball & Roller Bearings	347.3	+ 0.4	+ 3.0
Cutting Tools & Accessories	285.7	+ 0.2	+ 2.8
Heating Equipment	257.3	0	+ 3.5
Plumbing Fixtures & Brass Fittings	307.9	+ 0.3	+ 2.7
Metal Containers	357.5	- 0.2	+ 3.5
Miscellaneous Metal Products	301.9	0	+ 3.4

Data based on U.S. Labor Dept.'s Producer Price Index

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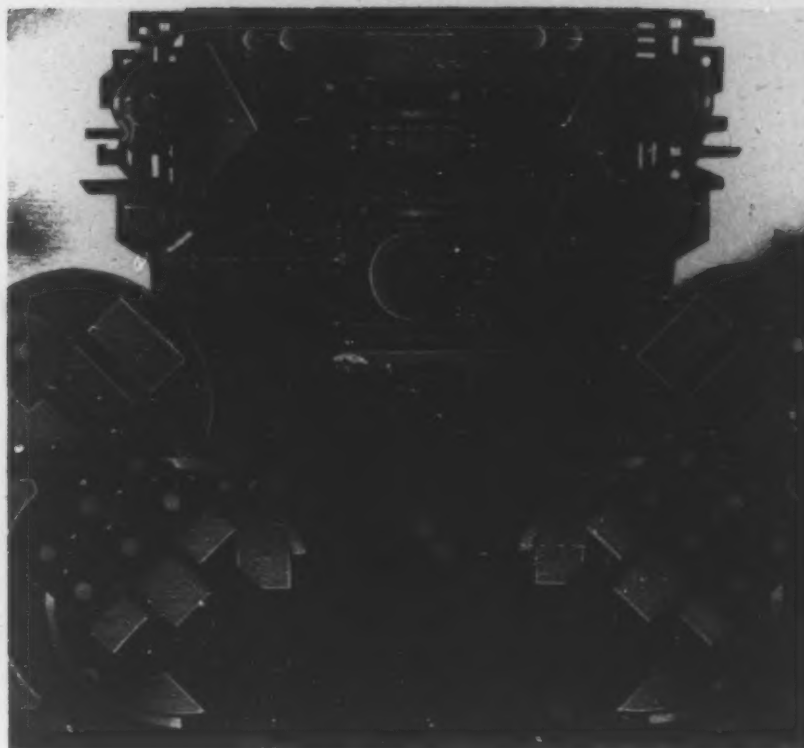
MANUFACTURING MANAGEMENT



Milestones in American Manufacturing

IRON AGE

CHILTON'S
MANUFACTURING MANAGEMENT



Editorial

An issue you can't overlook.

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Yesterday

In tracing the history of the 50 greatest manufacturing developments that provided America with its greatness, our journey begins with steelmaking and its evolution. While steelmaking was the first technology, it was not the only development that the nation would count on to propel it forward.

Along the way, men with visions of machinery and factories would add an immeasurable value to the development of the country.

And it was men like John Williams, with the wisdom and foresight to prepare the facts of important technologies as they became a part of America's historical landscape. Without them, none of what you are about to read, in this, the 130th anniversary of *Iron Age*, could have come true.

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Tomorrow

As man reaches into space and begins to explore beyond his own limits, technology will provide the rocketship to get him there.

It will become obvious that, to get to there from here, our generation and the next generations will use the best technology available.

On the following pages *Iron Age's* editorial staff examines the technologies that manufacturing executives will have to contend with in the last decade and half of this century and the 21st century, technologies that will make a difference in the way we conduct our business and determine who will succeed on this planet in the years ahead.

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Next Issue: Robotics and Automated Assembly

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ONE OF THE AMERICAN BROADCASTING COMPANIES

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective May 13, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	181	185	198	247
Pittsburgh	199	211	240	298
Youngstown	108	108	112	102
Lake Erie	148	161	169	155
Detroit	153	150	146	174
Chicago	505	509	510	581
Cincinnati	86	89	107	124
St. Louis	57	50	65	89
Southern	236	220	230	238
Western	94	87	84	90
U.S. Production	1,767	1,770	1,861	2,110

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80%—Pickands Mather as of 1/27/81.

86.9%—U.S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82. and Hanna Mining as of 2/26/82.

**Effective 8/1/83.

NONFERROUS PRICES

(Effective May 6, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	51.08	50.61	5/13/85
Copper (C)	70.00-71.00	69.00-71.00	5/10/85
Lead	20.00-21.00	21.00	4/11/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	250.87	253.23	5/13/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	46.00-47.00	45.00-47.00	5/1/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$125.15
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$321.00
Gold per troy oz.	\$2.50
Iridium, dollars per troy oz.	\$475.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$303.00-312.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$113.00
Platinum, per troy oz.	\$272.00
Rhodium, per troy oz.	\$925.00
Silver ingots, per troy oz.	\$6.515
Vanadium	\$6.00
Zirconium sponge (Per lb. unless otherwise noted)	\$12.00-17.00

Strait Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

May 6—508.06	May 9—523.89
May 7—514.63	May 10—525.94
May 8—518.56	

Scrap Prices

Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	64	54 1/4
Yellow brass	57 1/2	49 3/4
Red brass	60 1/2	50 1/4
Comm. bronze	61 3/4	50 1/2
Mang. bronze	50	49
Free cutting rod ends	49 1/2	48 1/2

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	59
No. 2 copper wire	50
Light copper	41

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	46
Light copper	37
No. 1 composition	49
No. 1 comp. turnings	47
Hvy. yellow brass solids	35
Hvy. yellow brass turnings	31
Radiators	39

STEEL PRODUCTION, COMPOSITE PRICES

(Effective May 13, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,767	1,770	32,683	37,101
Capacity Utilization Rate	68.9	69.0	67.6	76.0

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	26.939
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$70.17	\$71.50	\$80.50	\$89.50
No. 2 bundles	\$49.17	\$50.50	\$55.50	\$60.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$72.50	\$74.50	\$83.50	\$100.50
No. 1 steel, Philadelphia	69.50	71.50	78.50	82.50
No. 1 steel, Chicago	68.50	68.50	79.50	85.50
No. 1 bundles, Detroit	64.50	64.50	76.50	92.50
Low Phos., Youngstown	57.50	58.50	68.50	98.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	79.50
No. 1 mach'y cast., Phila	91.50	93.50	93.50	100.50
No. 1 mach'y cast., Chi	108.50	109.50	111.50	117.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative production points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Aluminum		
New mixed clips	32	—33
Old sheet	29	—30
Old cast	29	—30
Clean dry borings	30	—31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	28	—30
Mixed L.C. clips	26	—27
Old sheets and cast	24	—25
Borings and turnings	20	—22
Duraluminum clippings	24	—25

Copper and Brass

No. 1 copper wire	45	—46
No. 2 copper wire	37	—38
Light copper	32	—33
Radiators	31	—32
No. 1 composition	40	—41
No. 1 composition turnings	37	—38
Cocks and faucets	30	—32
Clean heavy yellow brass	28	—29
Brass Pipe	28	—29
New soft brass clippings	41	—42

Lead

Heavy soft lead	6	—8
Whale batteries	1	—3
Type metal	16	—17
Electrotype	13	—15

Nickel

Nickel solids	120	—130
Nickel rod ends	120	—130
Nickel sheets, clips	120	—130
Nickel turnings	40	—45

Zinc

New zinc clippings	17	—18
Old diecast zinc	13	—14

MATERIALS PRICES

EFFECTIVE MAY 13, 1985

(Effective May 13, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contracts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 72.00 to	\$ 73.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	82.00 to	83.00
No. 1 factory bundles (auto)	81.00 to	87.00
No. 2 bundles	56.00 to	57.00
No. 1 busheling	81.00 to	82.00
Machine shop turnings	8.00 to	9.00
Shoveling turnings	41.00 to	42.00
Cast iron borings	39.00 to	40.00
Low phos. punchings plate	90.00 to	91.00
Heavy turnings	64.00 to	65.00
Rails, 2 ft. and under	83.00 to	86.00
RR specialties	98.00 to	99.00
No. 1 machinery cast	87.00 to	88.00
Cupola cast	93.00 to	94.00
Heavy breakable cast	71.00 to	72.00
Stainless	64.00 to	65.00
18-8 bundles and solids	30.00 to	31.00
15-8 turnings	615.00 to	625.00
430 turnings	515.00 to	525.00

Chicago

No. 1 hvy. melting	\$ 68.00 to	\$ 69.00
No. 2 hvy. melting	64.00 to	65.00
No. 1 dealer bundles	79.00 to	80.00
No. 1 factory bundles (auto)	80.00 to	81.00
No. 2 dealer bundles	49.00 to	50.00
No. 1 busheling	76.00 to	77.00
Shredder scrap	76.00 to	77.00
Machine shop turnings	35.00 to	36.00
Mixed borings and turnings	36.00 to	37.00
Shoveling turnings	37.00 to	38.00
Cast iron borings	39.00 to	40.00
Low phos. forge scrap	103.00 to	104.00
Low phos. punchings plate	117.00 to	118.00
1 1/4 in. and heavier	112.00 to	113.00
Low phos. 2 ft. and under	112.00 to	113.00
No. 1 RR hvy. melting	71.00 to	72.00
Scrap rails random lgh	75.00 to	76.00
Repetier rails	96.00 to	97.00
Rails, 2 ft. and under	104.00 to	105.00
RR couplers and knuckles	90.00 to	91.00
RR car axles	107.00 to	108.00
No. 1 machinery cast	108.00 to	109.00
Cupola cast	95.00 to	96.00
Steel plate	94.00 to	95.00
Steel car wheels	84.00 to	85.00
Stainless		
18-8 bundles and solids	545.00 to	555.00
15-8 turnings	465.00 to	475.00
430 bundles and solids	130.00 to	135.00
430 turnings	100.00 to	105.00

Philadelphia

No. 1 hvy. melting	\$ 68.00 to	\$ 71.00
No. 2 hvy. melting	58.00 to	61.00
No. 1 dealer bundles	75.00 to	78.00
No. 2 dealer bundles	40.00 to	43.00
No. 1 busheling	75.00 to	78.00
Shredder scrap	80.00 to	83.00
Machine shop turnings	25.00 to	28.00
Mixed borings and turnings	25.00 to	28.00
Shoveling turnings	37.00 to	40.00
Low phos. 5 ft. and under	78.00 to	81.00
Low phos. 2 ft. punchings	97.00 to	100.00
Electric furnace bundles	85.00 to	88.00
RR specialties	78.00 to	81.00
Rails, 2 ft. and under	100.00 to	103.00
Cupola cast	77.00 to	80.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	40.00 to	43.00

Detroit

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 52.00 to	\$ 53.00
No. 2 hvy. melting	51.00 to	52.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	30.00 to	31.00
No. 1 busheling	63.00 to	64.00
Drop forge flashings	42.00 to	43.00
Machine shop turnings	41.00 to	42.00
Mixed borings and turnings	18.00 to	19.00
Shoveling turnings	42.00 to	43.00
Cast iron borings	25.00 to	26.00
Heavy breakable cast	35.00 to	36.00
Mixed cupola cast	50.00 to	51.00
Automotive cast	74.00 to	75.00
Stainless		
18-8 bundles and solids	510.00 to	520.00
15-8 turnings	415.00 to	425.00
430 bundles and solids	111.00 to	125.00

Youngstown

No. 1 hvy. melting	\$ 52.00 to	\$ 55.00
No. 2 hvy. melting	40.00 to	43.00
No. 1 dealer bundles	60.00 to	63.00
No. 2 dealer bundles	29.00 to	32.00
Machine shop turnings	8.00 to	11.00
Shoveling turnings	13.00 to	16.00
Low phos. plate	56.00 to	59.00
Electric furnace bundles	53.00 to	56.00
Galvanized bundles	46.00 to	49.00

Cleveland

No. 1 hvy. melting	\$ 52.00 to	\$ 55.00
No. 2 hvy. melting	30.00 to	33.00
No. 1 dealer bundles	58.00 to	61.00
No. 1 factory bundle	59.00 to	62.00
No. 2 bundles	28.00 to	31.00
No. 1 busheling	58.00 to	61.00
Machine shop turnings	13.00 to	16.00
Mixed borings and turnings	10.00 to	13.00
Shoveling turnings	18.00 to	21.00
Cast iron borings	15.00 to	18.00
Cur structural & plates, 2 ft. and under	90.00 to	93.00
Low phos. punchings plate	90.00 to	93.00
Drop forge flashings	43.00 to	46.00
Furnace steel, 2 ft. and under	69.00 to	72.00
No. 1 RR hvy. melting	60.00 to	63.00
Rails, 2 ft. and under	86.00 to	89.00
Rails, 18 in. and under	90.00 to	93.00
Steel pipe turnings	56.00 to	59.00
Railroad cast	87.00 to	90.00
No. 1 machinery cast	90.00 to	93.00
Cupola cast	55.00 to	58.00
Stainless	53.00 to	56.00
18-8 bundles	375.00 to	385.00
15-8 turnings	325.00 to	335.00
430 bundles	80.00 to	85.00

Buffalo

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 51.00 to	\$ 52.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 dealer bundles	62.00 to	63.00
No. 1 busheling	62.00 to	63.00
No. 2 bundles	32.00 to	33.00
Machine shop turnings	17.00 to	18.00
Mixed borings and turnings	17.00 to	18.00
Shoveling turnings	26.00 to	27.00
Cast iron borings	24.00 to	25.00
Low phos. plate	81.00 to	82.00
Structural and plate, 2 ft. and under	83.00 to	84.00
Rails, 2 ft. and under	83.00 to	84.00
Scrap rails random lgh	65.00 to	66.00
No. 1 machinery cast	76.00 to	77.00
No. 1 cupola cast	58.00 to	59.00

St. Louis

No. 1 hvy. melting	\$ 53.00 to	\$ 54.00
No. 2 hvy. melting	40.00 to	41.00
Furnace steel, 2 ft.	50.00 to	51.00
No. 1 dealer bundles	53.00 to	54.00
No. 2 bundles	35.00 to	36.00
Machine shop turnings	14.00 to	15.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	28.00 to	29.00
No. 1 RR hvy. melting	56.00 to	57.00
Rails, random length	66.00 to	67.00
Rails, 18 in. and under	72.00 to	73.00
RR specialties	71.00 to	72.00
Cupola cast	76.00 to	77.00
Heavy breakable cast	54.00 to	55.00
Steel plate	91.00 to	92.00
Steel car wheels	86.00 to	87.00
Rolling rails	68.00 to	69.00
Unstripped motor blocks	63.00 to	64.00

Birmingham

No. 1 hvy. melting	\$ 73.00 to	\$ 74.00
No. 2 hvy. melting	69.00 to	70.00
No. 1 dealer bundles	74.00 to	75.00
No. 2 bundles	48.00 to	49.00
No. 1 busheling	74.00 to	75.00
Shredder scrap	88.00 to	89.00
Machine shop turnings	27.00 to	28.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	37.00 to	38.00
Electric furnace bundles	70.00 to	71.00
Electric furnace, 3 ft. and under	70.00 to	71.00
Structural and plate, 2 ft.	91.00 to	92.00
Structural and plate, 4 ft.	85.00 to	86.00
No. 1 RR hvy. melting	85.00 to	86.00
Scrap rails random lgh	81.00 to	82.00
Rails, 2 ft. and under	94.00 to	95.00
Angles and splice bars	86.00 to	87.00
No. 1 cupola cast	84.00 to	85.00
Unstripped motor blocks	75.00 to	76.00

Cincinnati

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 46.00 to	\$ 47.00
No. 2 hvy. melting	43.00 to	44.00
No. 1 dealer bundles	52.00 to	53.00
No. 2 bundles	24.00 to	25.00
Machine shop turnings	4.00 to	5.00
Shoveling turnings	6.00 to	7.00
Cast iron borings	13.00 to	14.00
Low phos. 18 in. and under	78.00 to	79.00
Rails, random length	57.00 to	58.00
Rails, 2 ft. and under	72.00 to	73.00
No. 1 cupola cast	55.00 to	56.00
Heavy breakable cast	22.00 to	23.00
Drop broken cast	70.00 to	71.00

New York

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 46.00 to	\$ 47.00
No. 2 hvy. melting	37.00 to	38.00
No. 2 dealer bundles	22.00 to	26.00
Mixed borings and turnings	11.00 to	13.00
Machine shop turnings	6.00 to	7.00
Shoveling turnings	14.00 to	15.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	89.00 to	90.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	520.00 to	540.00
18-8 turnings	420.00 to	440.00
430 prepared solids	90.00 to	110.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 49.00 to	\$ 51.00
No. 2 hvy. melting	35.00 to	41.00
No. 1 dealer bundles	51.00 to	53.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	57.00 to	59.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	10.00 to	12.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	42.00 to	44.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	\$ 40.00 to	\$ 42.00
No. 2 hvy. melting	34.00 to	36.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	18.00 to	20.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	81.00 to	83.00

Los Angeles

No. 1 hvy. melting	\$ 43.00 to	\$ 45.00
No. 2 hvy. melting	36.00 to	38.00
No. 1 dealer bundles	34.00 to	36.00
No. 2 dealer bundles	18.00 to	20.00
Machine shop turnings	13.00 to	14.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	74.00 to	76.00
No. 1 cupola cast	75.00 to	77.00

Seattle

No. 1 hvy. melting	62.00 to	64.00
No. 2 hvy. melting	53.00 to	55.00
No. 2 bundles	14.00 to	16.00
No. 1 cupola cast	72.00 to	93.00
Mixed yard cast	2.00 to	84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 76.00 to	\$ 78.00
No. 2 hvy. melting	68.00 to	70.00
No. 1 dealer bundles	74.00 to	76.00
No. 2 bundles	32.00 to	34.00
Mixed steel scrap	50.00 to	52.00
Bush, new fact, prep'd	76.00 to	78.00
Bush, new fact, unprep'd	65.00 to	67.00
Machine shop turnings	33.00 to	35.00
Shredder scrap	33.00 to	35.00
Mixed borings and turnings	20.00 to	22.00
Cast scrap	98.00 to	100.00

Houston

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 71.00 to	\$ 72.00
No. 2 hvy. melting	57.00 to	58.00
No. 2 bundles	43.00 to	44.00
Machine shop turnings	15.00 to	16.00
Crushed turnings	32.00 to	33.00
Shredder scrap	79.00 to	80.00
Cut structural plate, 2 ft. and under	99.00 to	100.00
Cut structural plate, 5 ft. and under	83.00 to	84.00
Unstripped motor blocks	60.00 to	61.00
Cupola cast	84.00 to	85.00

STEEL PRICES

PRODUCER KEY

With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens, Inc., Coatesville, Pa.

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston

N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Nelsen Steel & Wire Co., Chicago
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Rablin Steel Corp., North Tonawanda, N. Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Corp., Buffalo, N. Y.

S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh

W3 Weirton Steel Corp., Weirton, W. Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh
W14 Whittar Steel Strip Div., Whittar Industries, Ltd., Detroit

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the receipts received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

	Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot Rolled 10 gauge	Cold Rolled 20 gauge	Galvanized 16 gauge	Hot Rolled Strip	Pipes	Standard Structurals	Hot Rolled (merchant)	Cold Finished	Hot Rolled 8620 As Rolled	Hot Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.	Atlanta	26.68	32.50	33.19	31.34	25.79	22.76	19.71	31.66	34.34	50.60	69.58	73.19
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.	Baltimore	26.63	30.41	35.35	36.82	32.66	28.80	22.28	36.15	51.69	56.95	63.60	69.98
G4 Greer Steel Co., Dover, Ohio	Birmingham	25.21	24.95	34.91	31.94	25.40	23.63	20.90	32.01	49.31	58.90	68.10	74.43
G5 Green River Steel Corp., Owensboro, Ky.	Boston	34.01	39.78	45.18	47.54	33.25	30.06	23.55	35.68	41.98	46.00	54.65	58.83
G6 Gibraltar Steel Corp., Buffalo, N. Y.	Buffalo	30.78	35.32	41.47	40.15	30.60	26.15	19.87	33.05	41.05	43.95	49.30	56.61
G7 Georgetown Steel Corp., Georgetown, S.C.	Chicago	28.45	35.40	37.50	29.14	23.53	20.19	17.87	27.72	32.30	41.66	46.98	52.91
H1 Hercules Drawn Steel Corp., Livonia, Mich.	Cincinnati	29.40	34.71	37.40	29.88	24.42	20.21	18.24	29.11	34.22	42.79	47.25	52.89
I2 Ingersoll Steel Div., Newcastle, Ind.	Cleveland	28.19	33.87	37.10	36.74	23.60	23.58	18.63	31.12	38.19	42.83	47.48	54.28
I3 Inland Steel Co., Chicago	Denver	31.12	37.80	35.80	37.09	27.40	24.55	20.10	38.52	50.55	57.95	65.95	70.19
I4 Interlake Steel Corp., Chicago	Detroit	29.14	35.12	37.85	29.03	24.45	20.78	17.60	29.12	34.09	42.46	47.29	53.49
J2 Jessop Steel Corp., Washington, Pa.	Houston	27.39	28.42	31.37	39.21	26.73	26.27	21.30	39.87	45.96	52.87	58.95	66.14
J3 Jones & Laughlin Steel Corp., Pittsburgh	Kansas City	30.41	36.61	39.30	34.01	27.10	23.68	17.94	33.91	39.60	45.40	49.73	54.87
J4 Joslyn Mfg. & Supply Co., Chicago	Los Angeles	26.77	31.05	37.46	33.96	28.10	32.31	26.14	37.78	50.88	57.10	63.15	70.64
J5 Judson Steel Corp., Emeryville, Calif.	Memphis	24.06	32.18	34.98	31.89	26.17	21.51	20.20	33.51	36.78	49.96	59.80	69.44
K2 Keystone Consolidated Industries, Inc.	Milwaukee	28.71	34.32	37.26	31.22	24.52	21.64	17.86	27.90	33.82	42.06	46.47	52.90
K3 Kentucky Electric Steel Co., Ashland, Ky.	New York	32.14	38.60	42.12	43.38	32.66	25.31	21.05	36.10	42.26	46.93	51.84	56.22
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.	Philadelphia	27.81	38.60	40.81	43.50	31.05	27.15	19.01	31.92	42.50	47.75	55.07	60.50
L2 La Salle Steel Co., Chicago	Pittsburgh	34.91	40.05	44.23	43.45	37.60	30.44	21.28	30.23	38.43	44.64	49.90	54.10
L3 Lone Star Steel Co., Dallas	Portland	28.67	31.75	38.34	36.56	34.65	34.78	26.78	41.54	49.78	57.74	69.73	.....
L4 Lukens, Inc., Coatesville, Pa.	San Francisco	26.67	31.23	36.66	34.13	27.50	30.19	25.71	38.43	50.70	57.69	63.90	70.05
M2 McLouth Steel Products Corp., Detroit	Seattle	28.00	29.81	36.28	32.95	22.02	27.02	25.69	38.87	53.03	61.70	69.75	74.63
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.	Spokane	20.99	30.11	35.28	36.02	35.00	34.00	21.95	42.01	43.20	47.52	.....	58.32
M9 Moltrup Steel Products Co., Beaver Falls, Pa.	St. Louis	28.81	32.25	36.97	34.59	23.89	21.73	18.18	32.05	38.12	43.51	47.85	53.69
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.	St. Paul	28.58	33.27	35.25	38.36	23.81	22.48	17.74	31.95	37.52	42.72	47.09	53.31

Base Quantities: All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—1 8" x 1"; Plate 1 4" x 84'; Shapes—1 Beams 6 x 12 5; Hot-rolled bar—Rounds 3 4 12 15 16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1 5 8" round; Cold drawn—1" round; Hot-rolled 4140—1 5 8" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

STEEL PRICES

Codes identify Producers listed on p. 160. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Re-rolling, Midwest	
W5	\$366.00
N4	\$366.00
West	
C6	\$346.00
Carbon Forging, East	
B3(2)	\$473.00
C10, U1	\$473.00
R3	\$453.00
Midwest	
R3, W5	\$453.00
U1	\$473.00
S1, I3	\$473.00
C10	\$473.00
K2	\$473.00
West	
C6	\$420.00
Alloy, East	
R3	\$492.00
B3	\$512.00
U1, C10	\$512.00
Midwest	
W5	\$492.00
U1, I3	\$512.00
C10	\$512.00
R3	\$492.00
S1	\$512.00
West	
C6	\$469.00

Structurals

Carbon, East	
B3	22.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3, T10, N4	23.90
South	
C16	23.90
T10	22.90
High Strength, Low Alloy, East	
B3	22.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
South	
C16	23.90
Wide Flange, Carbon, East	
B3	22.90
U1	22.75
J3	23.90
Midwest	
U1	22.75
N4	23.90
I3	23.90
Wide Flange, High Strength-Low Alloy, East	
U1	24.30
Midwest	
U1	24.30

Strip

Hot-Rolled, Carbon, Cut II, Edge—all widths, East	
U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1	23.75
U1, A7	23.75
I3, B3	23.75
M2	22.05
R3	22.05

South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East*	
E4	29.75
S10	29.60
P15	24.80
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05

High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge, All widths, (plus extras)*	
Midwest	
M2, R3	22.05
W3, J3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge	
Midwest	
S1	37.05
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	26.10
I4	25.20
Alloy, Cold-Rolled, East (plus extras)*	
E4 M8	43.35
B4	49.75
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Heavy)	
East	
B3	23.75
J3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5	23.75
S1, B3	23.75
I3, A7	23.75
West	
U1	24.25
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2)	28.15
J3	26.15
U1	28.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.85
J3	26.15
D1	26.15
U1, W5	28.15
S1, B3	28.15
I3, A7	28.15
West	
U1	28.65
South	
R3	24.65
Galvanized (hot dipped), East	
B3(2)	30.30
U1	30.30
Midwest	
J3, D1, W3	28.00
R3, Y1	28.00
G2, M11	30.00
U1, W5	30.30
S1, I3, A7	30.30
West	
U1	30.80
South	
R3	28.00
Enameling, Midwest	
U1, S1	29.65
I3, A7	29.65
J3	27.65
Long-Term, Midwest	
W5, A7, U1	31.65

R3	29.35
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Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
East	per base box
J3	26.29
U1	28.99
Midwest	
U1	28.99
J3	26.29
M11	27.54
W3	26.29
W5	28.99
West	
U1	29.49
South	
U1	28.99
Double Reduced (55 lb)*	
Midwest	
M11	21.95
J3	21.49
U1	23.38
W3	21.49
W5	23.38
West	
U1	23.88
South	
U1	23.38
Black Plate	
Single Reduced (70 lb)*	
East	
B3	24.81
Midwest	
J3, W3	24.01
I3	24.57
W5	25.55
U1	26.27
M11	26.27
West	
U1	26.27
Double Reduced (55 lb)	
East	
B3	20.49
Midwest	
W5, M11, U1	20.49
J3	18.93
W3	18.93
West	
U1	20.49
South	
U1	20.49
*75 lb—base weight extra 69¢	
**50 lb—base weight extra \$1.40	

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3, R5	25.80
J3	25.80
U1, C10, B3(3)	27.05
Midwest	
I4	26.00
U1, I3	27.05
R3, T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
T11, S8	31.00
J3(4), I2	31.00
M8, W10	31.00
N1	24.475

R4, B4	33.25
C10	31.00
Midwest	
W10, R3	33.25
J3	31.00
B1	33.45
L2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
West	
R3	37.15
South	
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
R5, K3	27.95
R3, J3	27.95
U1, B3(2), C10	29.20
Midwest	
R3	27.95
I3, C10, U1	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold-Drawn, East	
L2	35.20
R3, N1	37.90
R4	37.10
J3, W10, I2	34.85
T11, S8	34.85
C10	34.85
Midwest	
R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
L2	34.85
B5, M9	38.60
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3	23.25
I4, U1	25.75
P2	23.25
J3	26.75
Midwest	
B3	23.25
I3	25.75
J3, A7	22.80
U1, I4, S1	25.75
R3	26.75
West	
U1	25.75
O2	23.00
South	
R3	25.75
U1	25.75
Alloy East	
B3	31.05
U1, I4	33.55
P2	33.55
J3	34.55
Midwest	
B3	31.05
I4, U1	33.55
West	
O2	31.00
South	
U1	33.55

Wire

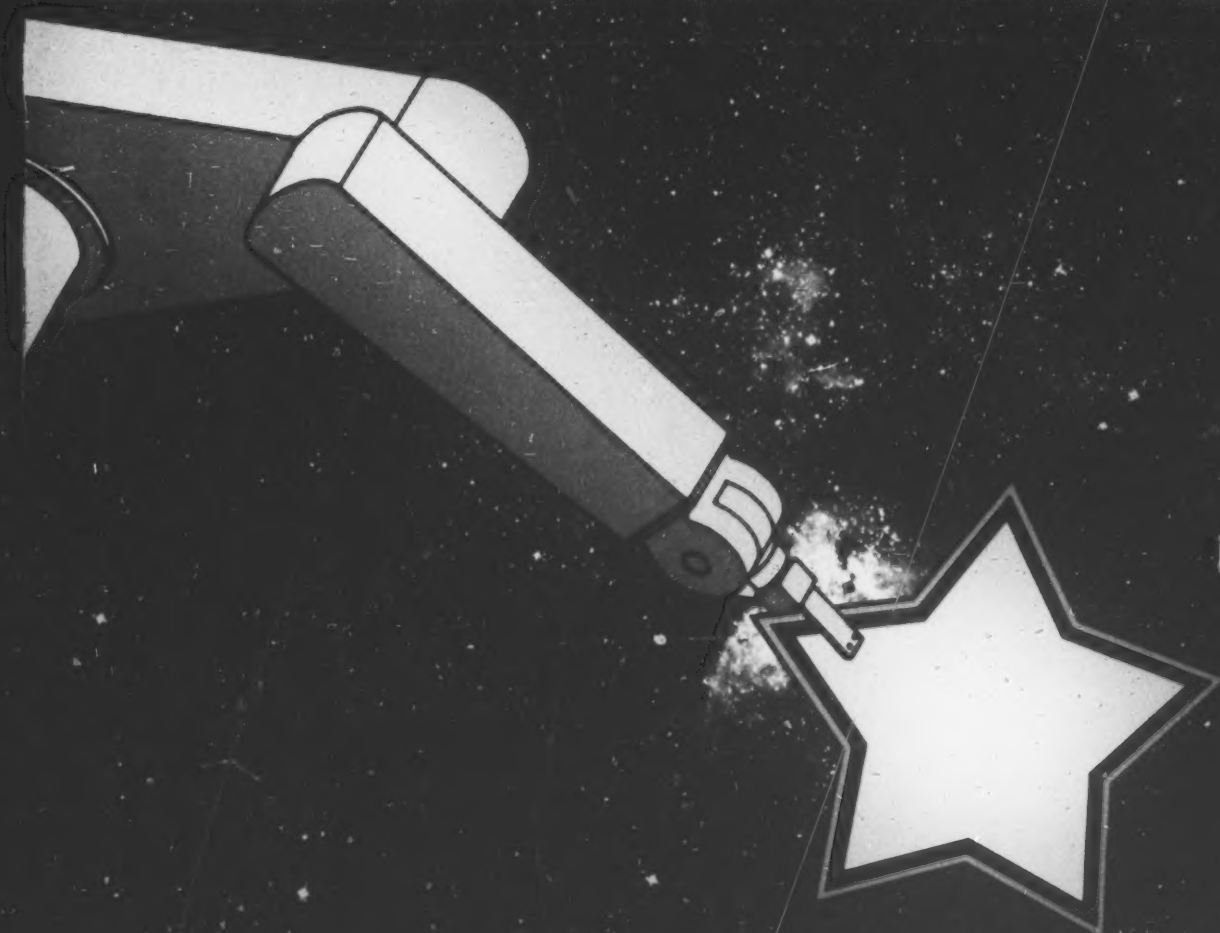
Carbon Steel Wire, East	
B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

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June 21, 1985

IRON AGE

MANUFACTURING MANAGEMENT

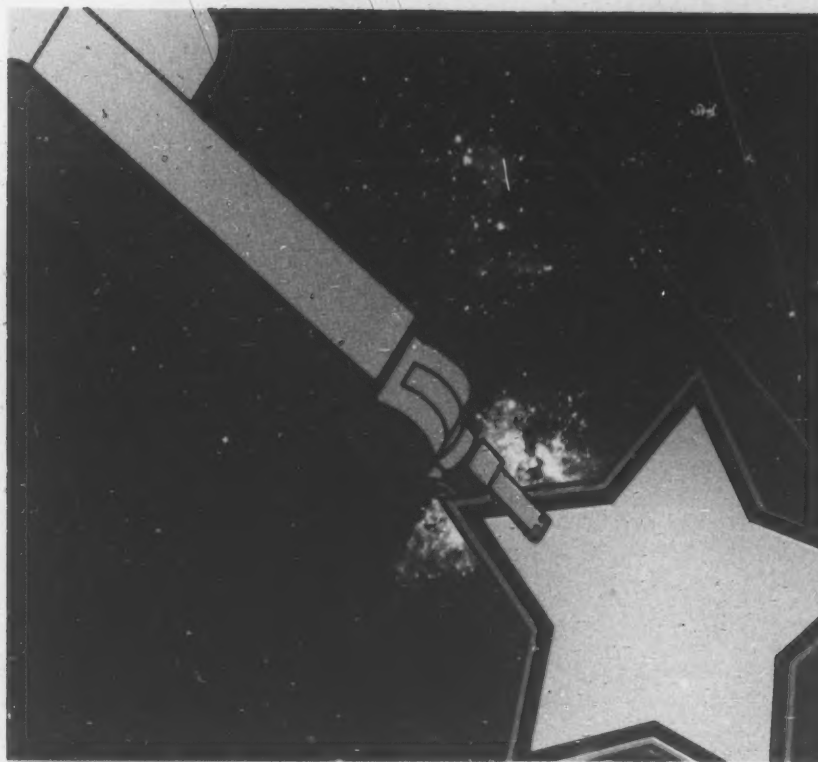


**ASSEMBLY ROBOTS:
THE FASTEST RISING STAR
IN A HOT TECHNOLOGY**

**TODAY'S MANAGER—PART THREE IN A
SERIES: HOW NEW JOBS ARE FOUND; NEW
CAREERS LAUNCHED**

**TOMORROW'S SURFACE COATINGS:
THEY'RE HERE TODAY**

IRON AGE
MANUFACTURING MANAGEMENT



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ONE OF THE **ABC** COMPANIES

THE FASTEST RISING STAR IN A HOT TECHNOLOGY

For years the great promise of robotics was to reach fulfillment in assembly operations. But only now are the manufacturers beginning to open their assembly room doors to robots.

BY ROBERT E. HARVEY

It used to be that robots and assembly were as compatible as oil and water. Firms bought robots that sprayed paint, spot welded, and moved materials about, but were, by and large, unable to integrate the promise of the robot with the needs of flexible assembly. Assembly robots were considered misfits. They were not as adaptable nor as easily taught as human assemblers; nor were they as fast or as accurate as fixed automation systems.

However, times have changed. In recent months, demand for assembly robots—particularly by automotive and electronics firms—has been strong. Purchases of assembly robots in the U.S. in 1984 were double 1983's totals. The figures will almost double again in 1985.

Nor will the growth stop here. A division of A.C. Nielsen Co., Dataquest Inc., a research facility in San Jose, Calif., predicts that purchases of robots by firms in the U.S. will grow at a compounded annual rate of 74 pct through 1988. Others are almost as optimistic. "Over the next couple years you may see the use of assembly robots grow at 50 pct or more per year," suggested Richard H. Johnson, Manager of Product and Market Planning, GMF Robotics Corp., Troy, Mich.

This sudden popularity is due, in no small degree, to a spate of technological developments, but the primary driving force is the growing awareness of the value of robotic assembly. This awareness, however, has been slow in dawning. Therefore, the Japanese have a sizable

lead over the U.S. in applying robots to assembly operations.

But that lead is being shortened by U.S. manufacturers who no longer perceive assembly robots as misfits but as devices that combine the best of humans and fixed automation. Robots, unlike people, do not get tired or produce parts of inconsistent quality. Nor are they hamstrung by the inflexibility inherent in other automation systems.

Increased foreign competition, the need to reduce inventories, and the imperative to improve quality is pushing increasing numbers of U.S. firms into robotic assembly.

The growing cost of carrying inventory and the increasingly volatile marketplace is forcing firms to examine flexible small batch assembly methods. The smaller the batch and the more flexible the operation, the faster a manufacturer can respond to changing market conditions and the less inventory he is stuck holding.

Robot Lines Can Be Flexible

Programmable robots give companies the ability to quickly restructure assembly lines as well as manufacture multiple products over a single flexible automated line. A manufacturer can greatly reduce costs if he is able to run several assemblies over the same line, taking advantage of the built-in flexibility of robots.

Even companies that don't need flexibility are buying robots. They are buying them off the shelf and adapting them to dedicated assembly rather than spending months and many dollars building specialized assembly equipment.

Not everyone is buying the same kinds of assembly robots, however.



Robots specifically designed for assembly, like this robotic system from IBM, combine the high flexibility of humans with the speed of automation.

"People in the robotic community are in agreement that there is a two-phased marketplace," said Mr. Johnson. "At one end, the market is demanding robots with higher function capability, while firms at the other end of the spectrum are looking for robots with lower level functions. The interest in the low level assembly robot is being sparked by the customer wanting to redesign his product line for robotic assembly."

There is no question that the Japanese lead the world in incorporating simple, fast, accurate robots into their operations. Japan has been at this game a little longer than the U.S., so they have many more robots installed in assembly.

The Japanese are very good at redesigning products so that they can be assembled by these limited capacity robots, robots with arm movements in only three or four axes. More general purpose robots usually

move through six axes.

The principal type of simple robot used by the Japanese is the SCARA (selective compliance assembly robot arm) robot. However, cylindrical and Cartesian-type robots are also common.

"Robotic assembly is just in its infancy in the U.S.," explained Glen Rohn, sales and marketing manager, VSI Automation, Troy, Mich. "One reason for its recent growth has been the introduction into the American marketplace of robots like the SCARA that have been particularly designed for assembly." In the past, robots were designed to be universal manipulators; however, today's robots increasingly are being designed for specific operations.

Robots, like the SCARA type, are very well suited for particular types of automated assembly. For years, the Japanese have been redesigning assembly to take advantage of the strengths of these robots. Because these robots have only limited axes of movement, products are often assembled on a plane; and most items are assembled perpendicular to that plane.

Part Location Replaces Vision

"These robots don't need vision," remarked Mr. Johnson of GMF, "because they can accurately locate parts and put them wherever needed. Even if the part is a little out of location, the robot will self-locate the part if the design changes that enable a robot to self-locate are put in place."

According to Mr. Rohn, with his firm's SCARA robots the "hold" on a robot arm can be relaxed allowing it to float free. With the proper fixturing, this floating arm can be guided into position to use a screwdriver or insert a fastener, even when the robot positioning or the part alignment is not perfect.

Opposite the low-end limited-function robots are the more sophisticated robot. Robots with advanced tooling; robots that can see, feel, and smell; robots that can adapt to unexpected changes in the workplace. In addition, these robots are being linked into networks to provide even greater flexibility and faster response. For example, based on sim-

ple commands from a high level network, a robot system can effortlessly change from assembling four-door cars to a two-door cars.

As robots grow in sophistication they become able to perform an increasingly wide range of assembly tasks. These sophisticated robots have so far made their appearance in small numbers but reportedly they are the wave of the future. Many experts believe that in five years nearly all robots sold will be able to see what they are doing.

"Robots are getting more sophisticated, which is making them applicable to more assembly tasks," said Mr. Johnson, "and that is what I would call the upper end or the sophisticated robot. As far as the vision interface, there are many viable vision systems both for two-dimensional finding and three-dimensional finding."

Waiting For The Perfect Robot

Some manufacturers, who do not yet use robots for assembly, are waiting for these advanced robot systems to be perfected. Vision and tactile feedback systems, they remark, are presently too expensive and too slow for many applications.

Industry experts counter this by pointing out that better robots will always be just around the corner; the robots available today are efficient, proven devices. And, they say, people who are not seriously looking at using robots for assembly are simply procrastinating.

"Because of the intensity of labor in assembly, there is little question about the need for robots in assembly," explained Vernon E. Estes, manager of product planning and market development of General Electric's Robots and Vision Systems Dept., Orlando, Fla. "A lack of technology is not the reason for a lack of robots in assembly. The problem has been to get enough managers educated to understand that there are benefits, achievable benefits, to be realized.

"I don't think that new technology is the chief driving force for robot usage because much of the technology is not particularly new. It is just that we have needed an understanding of the benefits and the people

Millions of Dollars
in Revenue

TWO
SHOOTING
STARS

Shipments of Assembly Robots to Companies in the U.S.

1979	— 1
1980	— 2
1981	— 3
1982	— 8
1983	— 14
1984	— 20
1985	— 54
1986	— 85
1987	— 145
1988	— 224

Figures include only those devices which come under the IRIA's definition of a robot.

Worldwide Shipments of Assembly Robots

1979	— 3
1980	— 7
1981	— 15
1982	— 33
1983	— 63
1984	— 100
1985	— 163
1986	— 264
1987	— 400
1988	— 596

Source: DELTAWARE INC., NEW YORK
Conf. Dir. of A.C. Nielsen Co.

Robotic assembly, the middle ground between manual and fixed automated assembly, attempts to combine the best of both worlds.

Manual Assembly

- very flexible
- easily taught
- very adaptable to change
- requires little tooling
- automatically inspects work
- costs constantly increase
- gets fatigued
- variable quality
- variable speeds

Robotic Assembly

- ideally, the best of both worlds

Fixed Assembly Automation

- very repeatable
- very reliable
- very fast
- limited flexibility
- expensive
- not adaptable
- untiring

with the ability to implement them. We have a lot more technology than implementation talent right now."

Sitting around, just waiting for the super, high-tech robot to come along is not the direction most companies should go, asserts Mr. Estes. "In most cases we have seen that the sophisticated vision-enhanced, all-everything robot was not what was needed. What was needed was just speed and accuracy. And even accuracy often can be compensated for. Mechanical compliant devices are available that allow for inaccurate positioning. Most electronic sensing and other sophisticated equipment has slowed operations down. You can't afford that."

In the near term, then, the growth of robots for assembly will depend on improved methods to deliver oriented parts to the robot's work area, rather than on vision and tactile feedback systems which tend to be too expensive and too slow for many applications.

Vision, Tactile Sensing Used

While it might not be best strategy for the average manufacturer to plunge right into top-of-the-line robotic assembly systems, applications do exist where very advanced robots

using tactile sensing, vision, adaptive control, and other advanced technologies perform very well.

Tom Reynolds, director of product marketing for Automatix Inc., Burlington, Mass., insists that for certain applications, vision and tactile sensing is a viable alternative to older assembly techniques. "This technology is clearly right today to solve some problems. Many of the problems that can be solved by vision are those not being automated today. It just has been too costly to do so—probably because tooling and fixturing costs are prohibitive. For example, tire loading on an automobile is impractical to do with hard tooling, but is a problem that can be solved today through the use of vision and robots."

Most robotic vision systems are operating in electronics or automotive companies. The reason is that they are under tremendous pressure from the competition to automate. In addition, both industries feel comfortable implementing innovative automation.

Assembly robots with vision already are saving firms considerable money. "For example, the automated guided vehicle is being used in-

creasingly in many manufacturing processes," said Mr. Reynolds. "These vehicles can stop in the real world within plus or minus half an inch down to plus or minus a quarter of an inch and sometimes less, but it is really very expensive to get under that quarter of an inch. But vision can take that plus or minus half an inch and make it plus or minus 0.015 of an inch. Now, a windshield can be snapped in, a bolt tightened, or a tire loaded automatically."

According to Mr. Reynolds the new applications for vision-guided robots will be in automating new applications rather than replacing hard automation. In automotive plants, the inroads will not come in highly automated body shops or paint shops but in the poorly automated chassis area where the chassis and engines are built up, where seats are put in, final trim is applied, and where windows are inserted, among other operations. These operations require precision, and vision can provide that precision at relatively moderate prices.

Vision and tactile sensing permit robots to adapt to existing assembly conditions. However, most of the assembly robots currently being installed lack sensing abilities, making it necessary to redesign assembly lines to accommodate the robots rather than the other way around. But designing an operation to make optimum use of robots is not easy. Numerous concerns must be addressed before successful implementation can be achieved.

100 Pct Is A Requirement

One problem that must be dealt with is imperfection. "Assembly has been called a dumping ground for everyone's garbage. What this means is that when you make or buy parts and you ship them to assembly, they are not 100 pct perfect," explained GE's Mr. Estes.

"You have to have systems, then, that either inspect parts 100 pct of the time at assembly to give the robots constantly good parts; or the system has to be able to recover without human intervention when parts do not go together. The problem is that most people who want to apply robotic technology don't real-

ize how many parts humans toss aside that don't fit. If the lack of human presence is not compensated for, robots will reduce the efficiency of a line rather than enhance it."

Design For Assembly

Besides rethinking the automation process, companies must design parts for automation. Integrating a robot into assembly is not enough. Understanding how parts can best be designed for a robot to assemble is equally important.

"It is very critical that product design engineers be made aware of what is available to the manufacturing engineer today. In the past, and even today, there is often an iron curtain between manufacturing and product design," explained Mr. Rohn. "Communications must exist so that the design engineers become aware of some of the basic principles of robot assembly, like trying to assemble from the vertical, attempting to use permanent fasteners instead of screws, and minimizing the amount of parts to be assembled."

Until robots are smart enough and flexible enough to handle situations like un-oriented parts, successful robot implementation will require ingenuity on the part of designers, manufacturing engineers, and purchasing. For example, parts should be designed and manufactured or supplied in an oriented manner to eliminate orienting costs.

The greatest efforts and costs in robotic assembly are not associated with the robot or robot programming, but in feeding parts to the robot. With the exception of some standardized parts-feeding in the electronic industry, parts delivery technology has lagged behind robot development. Inflexible feeding can greatly curtail the flexibility of a robot, while significantly increasing assembly costs.

"No question about it, part orientation is a major problem," conceded Mr. Estes. "We have done some work with the University of Rhode Island and have developed what I call programmable part orientation. The system looks at similar parts all thrown together, coming down a

conveyor. Vision tells the robot where the part is and which direction it is lying. The robot arm then comes down in a search mode and picks up the part.

"But, if you don't need that sophistication, you surely don't want to pay for it. Simplicity is the name of the game. It is frustrating to have manufacturing people tell me, 'I need vision or lasers,' but it is the same people who have not implemented anything."

"Delivery systems to the robots has been neglected," said Mr. Rohn of VSI. "And there have been many occasions where not only assembly robots but robots in general have gotten a bad name because people have been sold and the robot installed without support backup."

People, Automation Needed

Robots are not the only answer to flexible batch automation. Automation for most companies will be, for some time to come, a combination of hard automation, reprogrammable automation and manual labor. A number of tasks still exist which cannot yet be profitably automated.

"I think the ideal is still people and robots," said Mr. Estes. "I often tell people that if they need a device that has touch and vision and is very fast, the best thing they can buy is a human. There are tasks that are very easy for humans and are challenging as well, and those you can leave to people. Where the human is acting like a robot, there is where you want to put a robot."

If possible, firms should take an overall view of their assembly needs and then implement equipment in a modular fashion so that all the pieces will someday fit together. In reality, however, assembly equipment is usually purchased to fill an immediate need with little thought to the long term. But for whatever reason, firms should stop procrastinating and do something, comment several industry experts.

Using a robot can give a company numerous productivity advantages. The major advantage is speed, another is flexibility. "If you are going to put robots in, you want some flex-

ibility. You want to be able to change the part and handle parts differently. In some cases, you would like to be able to try the part and if it doesn't fit the assembly, recover without human intervention: a capability that you can get in robots today," said Mr. Estes.

"I think that flexibility and speed are the strengths of assembly robots. If these are not needed, I won't even bother purchasing a robot. People get all hung up on accuracy and they want a robot to be as accurate as a machine tool. But if they ever found a robot as accurate as they wanted it, they would probably not be able to afford it anyway. There are ways to design to get around that accuracy requirement."

"The use of robots is going to blossom in assembly," said William J. Finch, president, Finch Robotics, Montgomeryville, Pa., a robot consulting firm. "Assembly is the major growth area in robots today. Manufacturers, systems houses and users are on a learning curve, gradually getting familiar with robots, getting the bugs out of operations. But companies are beginning to move rapidly up that curve."

While there is no sign of that growth abating over the next five years, robots will no longer be concentrated almost exclusively in the automotive and electronics industries. Reportedly, 40 pct of all robots are in industries that are automobile related, but the prediction is that by 1990 it will be 14 pct.

Robots will continue to grow in sophistication and speed. "There is no inherent reason why sophisticated robots with vision have to be slow," observed Mr. Reynolds of Automatrix. "Vision itself is not very slow. The ability to take a picture, process the data and generate the result is very fast. However, it is the integration of vision into the proper control strategy of the robot, the transporter, and the end effector that makes for a very clumsy and sometimes slow system." On the horizon are integrated control systems expressly designed for adaptive robot control that will greatly speed up robot operations. □

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective May 28, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	172	175	192	258
Pittsburgh	236	227	227	323
Youngstown	102	102	111	108
Lake Erie	158	153	170	147
Detroit	152	158	147	175
Chicago	482	489	496	576
Cincinnati	94	89	100	104
St. Louis	66	61	64	92
Southern	253	249	228	230
Western	98	97	88	94
U.S. Production	1,813	1,800	1,823	2,118

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81

86.9¢—U.S. Steel as of 3/15/82 Cleveland City as of 2/26/82, Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82

**Effective 8/1/83.

NONFERROUS PRICES

(Effective May 28, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	50.16	50.65	5/28/85
Copper (C)	68.00- 70.00	69.00- 71.00	5/28/85
Lead	20.00- 21.00	21.00	4/11/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	255.81	255.17	5/28/85
Titanium Sponge	555.00- 585.00	555.00	4/29/82
Zinc	46.00- 47.00	45.00- 47.00	5/1/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM 99.8% pig. delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium-97% powder 200	\$178.00
Cadmium, ton lots	\$125-155
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$311.25
Indium, dollars per troy oz.	\$2.50
Indium, dollars per troy oz.	\$475.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$290.00-295.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective May 28, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,813	1,800	36,390	41,333
Capacity Utilization Rate	70.7	70.2	68.1	76.5

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base*	27.582	27.582	27.582	26.939
(¢/lb.—eff. 7/1/84)				
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$70.17	\$70.17	\$77.50	\$87.83
No. 2 bundles	\$49.17	\$49.17	\$55.17	\$59.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$72.50	\$72.50	\$79.50	\$97.50
No. 1 steel, Philadelphia	69.50	69.50	73.50	80.50
No. 1 steel, Chicago	68.50	68.50	79.50	85.50
No. 1 bundles, Detroit	64.50	64.50	76.50	87.50
Low Phos., Youngstown	57.50	57.50	58.50	95.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	79.50
No. 1 mach'y cast., Phila	91.50	91.50	93.50	100.50
No. 1 mach'y cast., Chi	108.50	108.50	111.50	117.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$167.00
Platinum, per troy oz.	\$271.00
Rhodium, per troy oz.	\$925.00
Silver ingots, per troy oz.	\$6.02
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo)

May 20—541.29	May 23—537.86
May 21—539.25	May 24—540.03
May 22—540.04	

Scrap Prices

Brass Mill Scrap

(Cents per lb., avg. 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	63	47
Yellow brass	56 3/4	49 3/4
Red brass	59 1/2	50 1/4
Comm. bronze	60 3/4	50 1/2
Mang. bronze	50	49
Free cutting rod ends	49	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	58
No. 2 copper wire	50
Light copper	41

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	54
No. 2 copper wire	46
Light copper	37
No. 1 composition	49
No. 1 comp. turnings	47
Hvy. yellow brass solids	34
Hvy. yellow brass turnings	31
Radiators	39

Aluminum		
New mixed clips	32	— 33
Old sheet	29	— 31
Old cast	29	— 31
Clean dry borings	30	— 31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	27	— 29
Mixed L.C. clips	25	— 26
Old sheets and cast	21	— 23
Borings and turnings	18	— 20
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 38
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	30	— 32
Clean heavy yellow brass	28	— 29
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	120	— 130
Nickel rod ends	120	— 130
Nickel sheets, clips	120	— 130
Nickel turnings	35	— 45

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

EFFECTIVE MAY 28, 1985

(Effective May 28, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 72.00 to \$ 73.00
No. 2 hvy. melting	62.00 to 63.00
No. 1 dealer bundles	81.00 to 82.00
No. 1 factory bundles (auto)	76.00 to 77.00
No. 2 bundles	56.00 to 57.00
No. 1 busheling	79.00 to 80.00
Machine shop turnings	7.00 to 8.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	38.00 to 39.00
Low phos. punchings plate	96.00 to 97.00
Heavy turnings	64.00 to 65.00
No. 1 RR hvy. melting	78.00 to 79.00
Rails, 2 ft. and under	95.00 to 96.00
Scrap rails, random lgh	82.00 to 83.00
RR specialties	88.00 to 89.00
No. 1 machinery cast	71.00 to 72.00
Cupola cast	64.00 to 65.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	615.00 to 625.00
18-8 turnings	515.00 to 525.00

Chicago

No. 1 hvy. melting	\$ 68.00 to \$ 69.00
No. 2 hvy. melting	64.00 to 65.00
No. 1 dealer bundles	79.00 to 80.00
No. 1 factory bundles (auto)	77.00 to 78.00
No. 2 dealer bundles	49.00 to 50.00
No. 1 busheling	71.00 to 72.00
Shredder scrap	76.00 to 77.00
Machine shop turnings	35.00 to 36.00
Mixed borings and turnings	36.00 to 37.00
Shoveling turnings	37.00 to 38.00
Cast iron borings	39.00 to 40.00
Low phos. large crop	103.00 to 104.00
Low phos. punchings plate	
1/4 in. and heavier	117.00 to 118.00
Low phos. 2 ft. and under	112.00 to 113.00
No. 1 RR hvy. melting	71.00 to 72.00
Scrap rails random lgh	75.00 to 76.00
Recoiler rails	96.00 to 97.00
Rails, 2 ft. and under	104.00 to 105.00
RR couplers and knuckles	90.00 to 91.00
RR car axles	107.00 to 108.00
No. 1 machinery cast	108.00 to 109.00
Cupola cast	95.00 to 96.00
Stove plate	94.00 to 95.00
Steel car wheels	84.00 to 85.00
Stainless	
18-8 bundles and solids	545.00 to 555.00
18-8 turnings	465.00 to 475.00
430 bundles and solids	130.00 to 135.00
430 turnings	100.00 to 105.00

Philadelphia

No. 1 hvy. melting	\$ 68.00 to \$ 71.00
No. 2 hvy. melting	58.00 to 61.00
No. 1 dealer bundles	75.00 to 78.00
No. 2 dealer bundles	40.00 to 43.00
No. 1 busheling	75.00 to 78.00
Shredder scrap	80.00 to 83.00
Machine shop turnings	25.00 to 28.00
Mixed borings and turnings	25.00 to 28.00
Shoveling turnings	37.00 to 40.00
Low phos. 5 ft. and under	78.00 to 81.00
Low phos. 2 ft. punchings	97.00 to 100.00
Electric furnace bundles	85.00 to 88.00
RR specialties	78.00 to 81.00
Rails, 2 ft. and under	100.00 to 103.00
Cupola cast	75.00 to 78.00
Heavy breakable cast	53.00 to 56.00
No. 1 machinery cast	90.00 to 93.00

Detroit

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 52.00 to \$ 53.00
No. 2 hvy. melting	51.00 to 52.00
No. 1 dealer bundles	64.00 to 65.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	63.00 to 64.00
Drop large flashings	42.00 to 43.00
Machine shop turnings	41.00 to 42.00
Mixed borings and turnings	18.00 to 19.00
Shoveling turnings	42.00 to 43.00
Cast iron borings	25.00 to 26.00
Heavy breakable cast	35.00 to 36.00
Mixed cupola cast	50.00 to 51.00
Automobile cast	74.00 to 75.00
Stainless	
18-8 bundles and solids	510.00 to 520.00
18-8 turnings	415.00 to 425.00
430 bundles and solids	115.00 to 125.00

Youngstown

No. 1 hvy. melting	\$ 50.00 to \$ 53.00
No. 2 hvy. melting	39.00 to 42.00
No. 1 dealer bundles	57.00 to 60.00
No. 2 dealer bundles	29.00 to 32.00
Machine shop turnings	8.00 to 11.00
Shoveling turnings	13.00 to 16.00
Low phos. plate	56.00 to 59.00
Electric furnace bundles	53.00 to 56.00
Galvanized bundles	46.00 to 49.00

Cleveland

No. 1 hvy. melting	\$ 50.00 to \$ 53.00
No. 2 hvy. melting	30.00 to 33.00
No. 1 dealer bundles	55.00 to 58.00
No. 1 factory bundles	56.00 to 59.00
No. 2 bundles	28.00 to 31.00
No. 1 busheling	55.00 to 58.00
Machine shop turnings	8.00 to 11.00
Mixed borings and turnings	10.00 to 13.00
Shoveling turnings	10.00 to 13.00
Cast iron borings	15.00 to 18.00
Cut structural & plates, 2 ft. and under	87.00 to 90.00
Low phos. punchings plate	87.00 to 90.00
Drop large flashings	43.00 to 46.00
Foundry steel, 2 ft. & under	69.00 to 72.00
No. 1 RR hvy. melting	60.00 to 63.00
Rails, 2 ft. and under	86.00 to 89.00
Rails, 18 in. and under	90.00 to 93.00
Steel axle turnings	36.00 to 39.00
Railroad cast	87.00 to 90.00
No. 1 machinery cast	90.00 to 93.00
Cupola cast	55.00 to 58.00
Stove plate	53.00 to 56.00
Stainless	
18-8 bundles	375.00 to 385.00
18-8 turnings	325.00 to 335.00
430 bundles	80.00 to 85.00

Buffalo

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 51.00 to \$ 52.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 busheling	62.00 to 63.00
No. 1 dealer bundles	62.00 to 63.00
No. 2 bundles	32.00 to 33.00
Machine shop turnings	17.00 to 18.00
Mixed boring and turnings	17.00 to 18.00
Shoveling turnings	26.00 to 27.00
Cast iron borings	24.00 to 25.00
Low phos. plate	81.00 to 82.00
Structural and plate, 2 ft. and under	83.00 to 84.00
Rails, 2 ft. and under	83.00 to 84.00
Scrap rails, random lgh	65.00 to 66.00
No. 1 machinery cast	76.00 to 77.00
No. 1 cupola cast	58.00 to 59.00

St. Louis

No. 1 hvy. melting	\$ 53.00 to \$ 54.00
No. 2 hvy. melting	40.00 to 41.00
Foundry steel, 2 ft.	50.00 to 51.00
No. 1 dealer bundles	53.00 to 54.00
No. 2 bundles	35.00 to 36.00
Machine shop turnings	14.00 to 15.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	28.00 to 29.00
No. 1 RR hvy. melting	56.00 to 57.00
Rails, random length	59.00 to 60.00
Rails, 18 in. and under	72.00 to 73.00
RR specialties	71.00 to 72.00
Cupola cast	76.00 to 77.00
Heavy breakable cast	54.00 to 55.00
Stove plate	91.00 to 92.00
Steel car wheels	79.00 to 80.00
Recoiler rails	68.00 to 69.00
Unstripped motor blocks	63.00 to 64.00

Birmingham

No. 1 hvy. melting	\$ 73.00 to \$ 74.00
No. 2 hvy. melting	69.00 to 70.00
No. 1 dealer bundles	74.00 to 75.00
No. 2 bundles	48.00 to 49.00
No. 1 busheling	74.00 to 75.00
Shredder scrap	87.00 to 88.00
Machine shop turnings	27.00 to 28.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	37.00 to 38.00
Electric furnace bundles	70.00 to 71.00
Elec. furnace, 3 ft. & under	70.00 to 71.00
Structural and plate, 2 ft.	86.00 to 87.00
Structural and plate, 4 ft.	85.00 to 86.00
No. 1 RR hvy. melting	83.00 to 84.00
Scrap rails, random lgh	77.00 to 78.00
Rails, 2 ft. and under	91.00 to 92.00
Angles and splice bars	83.00 to 84.00
No. 1 cupola cast	84.00 to 85.00
Unstripped motor blocks	75.00 to 76.00

Cincinnati

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 44.00 to \$ 45.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 dealer bundles	49.00 to 50.00
No. 2 bundles	24.00 to 25.00
Machine shop turnings	4.00 to 5.00
Shoveling turnings	6.00 to 7.00
Cast iron borings	13.00 to 14.00
Low phos. 18 in. and under	76.00 to 77.00
Rails, random length	54.00 to 55.00
Rails, 2 ft. and under	69.00 to 70.00
No. 1 cupola cast	55.00 to 56.00
Heavy breakable cast	22.00 to 23.00
Drop broken cast	70.00 to 71.00

New York

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 44.00 to \$ 45.00
No. 2 hvy. melting	35.00 to 36.00
No. 2 dealer bundles	20.00 to 24.00
Mixed borings and turnings	10.00 to 11.00
Machine shop turnings	4.00 to 6.00
Shoveling turnings	10.00 to 12.00
Clean cast, chem. borings	35.00 to 36.00
No. 1 machinery cast	79.00 to 80.00
Mixed yard cast	50.00 to 51.00
Heavy breakable cast	10.00 to 12.00
Stainless	
18-8 prepared solids	520.00 to 540.00
18-8 turnings	420.00 to 440.00
430 prepared solids	90.00 to 110.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 49.00 to \$ 51.00
No. 2 hvy. melting	39.00 to 41.00
No. 1 dealer bundles	51.00 to 53.00
No. 2 bundles	32.00 to 34.00
No. 1 busheling	57.00 to 59.00
Shredder scrap	59.00 to 61.00
Machine shop turnings	10.00 to 12.00
Shoveling turnings	18.00 to 20.00
No. 1 machinery cast	75.00 to 80.00
Mixed cupola cast	42.00 to 44.00
Heavy breakable cast	8.00 to 10.00

San Francisco

No. 1 hvy. melting	\$ 40.00 to \$ 42.00
No. 2 hvy. melting	34.00 to 36.00
No. 1 dealer bundles	31.00 to 33.00
No. 2 dealer bundles	18.00 to 20.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	8.00 to 9.00
No. 1 cupola cast	81.00 to 83.00

Los Angeles

No. 1 hvy. melting	\$ 43.00 to \$ 45.00
No. 2 hvy. melting	36.00 to 38.00
No. 1 dealer bundles	34.00 to 36.00
No. 2 dealer bundles	18.00 to 20.00
Machine shop turnings	13.00 to 14.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	8.00 to 9.00
Elec. furnace, 1 ft. and under (foundry)	74.00 to 76.00
No. 1 cupola cast	75.00 to 77.00

Seattle

No. 1 hvy. melting	62.00 to 64.00
No. 2 hvy. melting	53.00 to 55.00
No. 2 bundles	36.00 to 38.00
No. 1 cupola cast	92.00 to 93.00
Mixed yard cast	82.00 to 84.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 76.00
No. 2 hvy. melting, cut 2 ft. and under	58.00
No. 1 dealer bundles	74.00
No. 2 bundles	52.00
Mixed steel scrap	50.00
Bush. new fact. prep'd	74.00
Bush. new fact. unprep'd	65.00
Machine shop turnings	33.00
Short steel turnings	33.00
Mixed borings and turnings	20.00
Cast scrap	90.00

Houston

Brokers buying prices per gross ton on cars	
No. 1 hvy. melting	\$ 71.00 to \$ 72.00
No. 2 hvy. melting	57.00 to 58.00
No. 2 bundles	43.00 to 44.00
Machine shop turnings	15.00 to 16.00
Crushed turnings	32.00 to 33.00
Shredder scrap	79.00 to 80.00
Cut structural plate, 2 ft. and under	99.00 to 100.00
Cut structural plate, 5 ft. and under	83.00 to 84.00
Unstripped motor blocks	60.00 to 61.00
Cupola cast	84.00 to 85.00

RANGE OF PRICE CHANGES CONTINUES TO NARROW

Producer finished goods prices in April continued to edge up only grudgingly.

The U.S. Department of Labor's index rose 0.3 pct on a seasonally adjusted annual basis. That followed a 0.2 pct rise in March.

These prices rose by only 0.7 pct over the first 4 months of 1985.

Energy prices moved up a strong 5.8 pct in April. However, prices of consumer foods declined by 1.0 pct. The April food price drop was the deepest decline in any month over the past 12 months.

Prices of capital equipment were unchanged in April. Price decreases for motor vehicles, transformers and machine tools offset increases for aircraft, office machines and commercial furniture.

The table here gives a picture of remarkable price stability in metalworking product lines. Month-to-month price declines were scored by 5 of the 22 product lines listed. In 7 lines, no price changes occurred. Prices were up by only 0.1 pct in six categories.

In sum, 18 of the 22 product lines showed actual price declines, or remained almost static in April.

The two lines showing the strongest price push in April were mechanical power transmission equipment (up 0.7 pct), and railroad equipment (up 0.4 pct). Those showing the most notable price weakness were construction machinery and equipment and heating equipment, both down by 0.2 pct.

These strongest of the up and down movements in April do not point to any trend. The product lines have had similar ups and downs over a long span of time.

The combination of slowed business and world-level competition continues as the leading cause of price stability in metalworking goods lines.

Latest Month Covered: April 1985

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	396.0	0	+ 3.2
Metal Forming Machine Tools	432.6	- 0.1	+ 2.8
Agricultural Machinery & Equip.	339.0	0	+ 1.0
Construction Machinery & Equip.	361.2	- 0.2	+ 1.0
Industrial Process Furnace & Ovens	384.1	+ 0.1	+ 2.9
Industrial Material Handling Equip.	293.9	0	+ 2.2
Pumps, Compressors & Allied Equip.	355.4	- 0.1	+ 1.5
Fluid Power Equip. (Dec. 1970 = 100)	263.8	+ 0.3	+ 2.6
Mechanical Power Transmission Equip.	337.6	+ 0.7	+ 4.5
Automobiles	226.9	0	+ 2.2
Motor Trucks—Light	296.1	0	+ 4.8
Motor Trucks—Heavy	332.3	0	- 0.6
Railroad Equipment	364.0	+ 0.4	+ 2.7
Fabricated Metal Structural Products	314.3	0	+ 1.6
Electric Motors	350.6	+ 0.1	+ 3.3
Valves & Fittings (Dec. 1982 = 100)	104.4	+ 0.1	+ 2.5
Ball & Roller Bearings	347.1	- 0.1	+ 2.7
Cutting Tools & Accessories	285.9	+ 0.1	+ 2.7
Heating Equipment	257.8	- 0.2	+ 3.0
Plumbing Fixtures & Brass Fittings	311.3	+ 1.1	+ 3.3
Metal Containers	358.0	+ 0.1	+ 3.7
Miscellaneous Metal Products	302.1	+ 0.1	+ 3.1

Data based on U.S. Labor Dept.'s Producer Price Index

CHILTON'S

C2150-8

July 5, 1985

IRON AGE

MANUFACTURING MANAGEMENT



YES, BUT ONLY IF THE
CONSUMER KEEPS BUYING

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1ST QUARTER EARNINGS STEADY
THE FED. RESERVE'S NEW POLICY
HOW TO MANAGE IN A RECESS
QUALITY CONTROL
THE NEW 1985 TRUCKS
IN STOCK

IRON AGE

MANUFACTURING MANAGEMENT



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At midpoint 1985, the American consumer stands poised like Atlas. On his shoulders rests the U. S. economy.

Will he continue to be the strong man? Or, will he shrug?

A shrug could tumble the economy into a recession. Some analysts contend the economy is already perilously close to being in one.

And business executives in some industrial goods lines say they have already crossed the dark threshold of recession.

It's that kind of an economy at mid-1985. Autos look good. Appliances look good. Housing looks good. But many lines of industrial equipment — and even computers — are in the doldrums.

"The consumer is the only one

who can pull the economy from the precipice right now," said one economist. "He's the only one out there with the money to spend and the guts to borrow more. He's the one on a roll. He's the hot hand."

And lately — on May 17 to be exact — the consumer was given a hypo that may give him the extra push he needs to do the job everybody is looking for him to do.

That date was when the Federal Reserve Board lowered the discount rate to 7.5 pct from 8 pct — the lowest such rate in 7 years.

Of course, not only the consumer, but the entire economy was given a hypo by the May 17 rate cut.

The Fed's action is important for two reasons: For one, it could, in time, spur an economy that has seri-

ously slowed. Second, the cutting of the rate was a symbol of great economic hope. The cut announced to the country that the Fed is determined to keep the economy on a strong growth track.

The discount rate, the interest rate the Fed charges on loans it extends to commercial banks and savings institutions, is a key one in the economy. If banks can borrow cheaper, then they can charge less interest on the loans they make to business borrowers and consumers

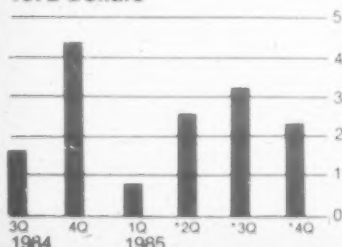
Questions Raised.

Still, there are reservations on the likely impact of the discount rate reduction.

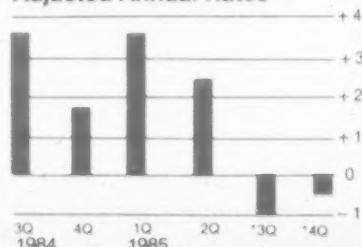
Consumers may be in too deep a

(Cont. on p. 23)

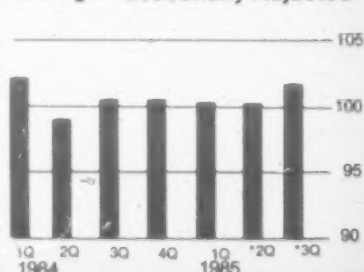
GNP
Pct Increases at Seasonally
Adjusted Annual Rates
1972 Dollars



Plant & Equipment Spending
Pct Quarter to Quarter
Changes at Seasonally
Adjusted Annual Rates



New Orders, Durable Goods
Billions of Dollars, Monthly
Averages Seasonally Adjusted



debt hole to pick up their buying. Too, the rate cut may be too little too late for many troubled manufacturing industries.

However, those reservations have been countered by some analysts. For example, one asked, "Who is to say interest rates won't go down and down and bring on a powerful resurgence in the economy now beyond our wildest hopes?"

A prime rate of 8 pct or less has been predicted for this year by at least two leading economists. If that rate — or an even lower one — does prevail, then a lot of the reservations now being sounded about the economy will be washed away.

What has happened that thrust the consumer into a starring role in the Hope-for-a-Resurgent-Recovery drama? Why is corporate America playing a minor role?

It doesn't take any long list of data to find answers to these questions.

In the first quarter, the economy grew at an annual rate of 0.7 pct. Consumer expenditures, as an element in that economy, grew at a 5.2 pct rate. In the same period, the growth rate of government spending — Federal, state and local — fell by almost a 2 pct rate. Business investment in new machinery and equipment fell by a 2.6 pct rate.

A one-quarter flip-flop?

Not so. The turn downs in government spending and business investment represent low points in declining growth rates that started following the second quarter last year. In the face of these bumps down a ladder, consumer spending over the same time span continued to grow.

King Consumer

In the face of the weakness in the business sector, clearly, the consumer has been marching to another beat.

On top of all his prosperity relative to other sectors of the economy, it must be remembered that the consumer accounts for 67¢ out of every dollar expended in the economy. He's now called Atlas for good reasons.

Record-high employment and in-

come levels have raised the spirits of consumers. Surveys show consumer attitudes at near-record levels.

In fact, there are two related consumer-optimism trends that downright worry a growing number of economists. The self-assured consumer has been very willingly piling up debt at a record pace to sustain his buying. At the same time, he has been drawing heavily on his savings.

At the close of the first quarter, consumer installment debt totaled \$477 billion. That was an all time high 15.1 pct of total personal income.

The borrowing still has not seemed enough for consumers. Their savings, as a percent of after-tax income, fell to 4.5 pct in the March period. That was down from rates of over 6 pct for the two previous quarters.

Is It Bad News?

This picture of high debt and low savings has led some observers to foresee the consumer very shortly hitting a debt wall. Then they see all the consumers' bubbly attitudes and big buying coming to an abrupt end.

The growing number of economists who hold that vision of the consumer situation are forecasting a growth recession for the last half this year. A growth recession comes about when the economy does not expand strongly enough to sustain employment levels — any growth rate less than about 3 pct.

But that doesn't have to happen. One reason it doesn't is that if interest rates go even lower, as some foresee, then a second major benefit of lower rates will come into play.

Lower rates will mean that investment in this country will become less attractive to foreigners. After all, rates of return in the U. S. will not be much above those worldwide. The resulting drop in demand for U. S. dollar holdings would lessen the strength of the dollar. And if that happens, prices of imports for Americans will rise and prices of U. S. exports to foreigners will decline.

That entirely possible scenario would mean that U. S. consumer ex-

penditures for imports would fall off, and much of that buying would turn homeward. At the same time, of course, exports of U. S.-made goods would be cheaper to buy in world markets.

A Big Lift

Any such buying shift would be a great big plus for U. S. business. After all, in April, the U. S. trade deficit totaled \$11.8 billion. That means this deficit, for the first 4 months this year, ran some 5.4 pct ahead of the blistering deficit pace over the same time span last year. In 1984, the trade deficit came to a record \$124 billion, with the manufactured goods share of the deficit coming to \$88 billion, also a record.

Too, the dollar-easing possibility is reinforced by a recent projection that points to the U. S. economic growth rate coming into better alignment with the growth rates of America's leading world trading partners as the year goes on.

Last year, the U. S. economic growth rate was much stronger than for any of this country's top six trading partners.

The prospering U. S. market thus became Target A for those, and other, world competitors.

Now comes the forecast of the Organization for Economic Cooperation and Development for 1985. This forecast shows U. S. growth exceeding the average growth of these other nations by a 0.3 percentage point. Last year, U. S. growth ran ahead by a staggering 3.3 percentage points. Clearly, that was an open invitation to an import flood.

On balance then, lower interest rates will likely spur consumer buying anew in the last half of the year. Also, importantly, more of that buying will likely be for American-made goods as the dollar's exchange value weakens and makes imports costlier.

This chain of events points to some pickup in business volume for U. S.'s many battered manufacturing industries. Business will be better than in the first quarter this year, but won't be anywhere near up to last year's solid showing. □

STEEL

The steel market isn't collapsing.

That much can be said with reasonable certainty. Mill orders were drifting downward in late June, but with a large portion of the July tonnage in hand, there was no sign of the sharp downturn that took place in the second half of 1984.

There was no sign, either, that demand was going to move up to profitable levels. Steel analysts were holding to projections that called for shipments to go from 19.5 million tons in the second quarter to 18.5 million tons in the third quarter.

This was hardly a bright prospect, but it was a lot better than what happened in 1984. Last year, steel shipments fell from over 20 million tons in the second quarter to 17 million tons in the third quarter. There was a further slide last year to 16 million tons in the fourth quarter.

The current predictions were consistent with summer bookings. However, the bookings didn't extend far beyond July and early August. For anything later, the mills had to rely on judgments about the domestic economy and international trade.

One important judgment was that neither end users nor service centers have built the surplus inventory that helped produce the downturn in 1984. The inventory calculation involved some guesswork because there is no firm information on import tonnage for May and June.

A second element in the market equation was consumption. The mills assume that around 96 million tons of steel will be consumed in the U.S. this year. The auto companies are expected to continue chewing up large quantities of steel although their orders have started to reflect the seasonal slowdown.

Construction activity is seen holding up, but the steel requirements of machinery builders are lagging. The net effect of the various market

movements will probably be a slight drop in the consumption rate.

If all goes well, this will be more than offset by declining steel imports in this second half. Under the Reagan Administration's voluntary restraint program, steel imports are supposed to fall from a record 26 million tons in 1984 to around 21 million tons in 1985.

In the first four months of 1985, there was no real decline in imports. Steel entered the country as fast as it did in 1984. It looked as though the first half total would be around 12 million tons.

That would be the same as the 1984 first half total. In 1984, however, imports rose to nearly 14 million tons in the second half of the year. In the current year, imports should come down to 10 million tons in the second half. That would be a drop of 2 million tons from the first half of this year and 4 million tons from the second half of 1984.

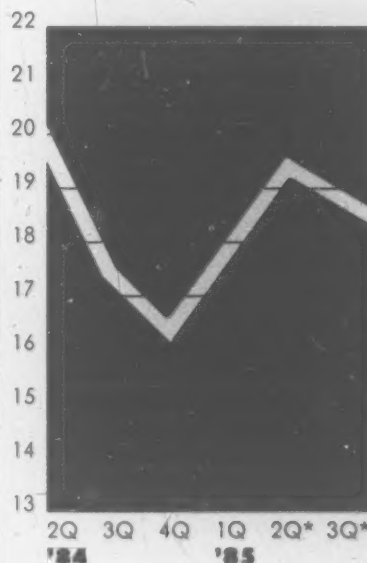
One new factor in the market picture is the uncertain labor situation. In recent years, the largest steel companies bargained jointly with the United Steelworkers of America, (USWA). This has produced peaceful settlements since 1959.

Before and after the 1983 bargaining, a number of smaller mills were able to negotiate contracts that were less costly than the pattern of the joint group. This led the biggest companies to demand equal treatment from the Steelworkers and eventually brought on the end of coordinated bargaining. The no-strike agreement, once part of steel bargaining, ended prior to 1983 talks.

No one knows what will happen when steel labor contracts expire in 1986. At one time the approach of a steel strike deadline brought massive 'hedge' buying by users. Users would begin to line up steel the year before the deadline.

Neither end users nor service centers have built the surplus inventory that helped produce the downturn in 1984.

Steel Shipments
In Millions of Tons



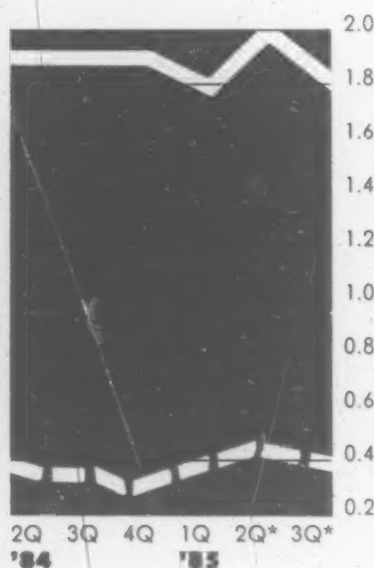
Source: AISI

*1A estimate

NONFERROUS

The third quarter, with its usual seasonal factors, isn't expected to make things easier (for nonferrous metals).

Nonferrous Metals Shipments
In Millions of Short Tons



— Aluminum
— Copper

Source: American Bureau of Metal Statistics.

Aluminum Assn.

*1A estimate

Industrial consumption of base nonferrous metals still was running at a fairly good clip during the second quarter, but the metals producers were nowhere nearer cashing in on it, in terms of better prices, than they were at the start of the year. And the third quarter, with its usual seasonal factors, isn't expected to make things any easier.

Prices for primary aluminum and copper turned easier on the hedge markets more than halfway through the second quarter, while lead prices slipped and zinc steadied.

One of the problems for the aluminum producers has been that production worldwide wasn't coming down fast enough. Going into the second quarter, the producers were still pouring metal at a rate only 5.5 pct under the 1984 peak set last June. U.S. primary ingot output in the first half was down 10 to 12 pct, but production elsewhere ran just about on par with the same 1984 period. The industry's current inventory problems began when facilities were reactivated too fast during the early 1984 recovery.

The U.S. smelters accounted for about half of last year's 16 pct jump in primary ingot production worldwide. This year, their domestic facilities have accounted for the bulk of the cutbacks. European production was down, but this was offset by increased production in Australia, Latin America and South Asia.

U.S. aluminum shipments were down about 7.5 pct in the first quarter. Though incoming orders were off the 1984 pace, they still were ahead of shipping volume. By mid-year, bookings were 5 pct to 6 pct ahead of 1984, but the main buying interest was centered on ingot and extruded products, neither of which rank high on the value-added scale.

Better shipping volume and a downtrend in hedge market inven-

tories didn't help copper prices much during the first half either. Prices began retreating late in May, canceling out another brief rally and once again delaying the long-expected response to favorable longer term fundamentals. Copper imports were down about 32 pct in the first quarter, reversing the 1983-84 trend. Shipments by U.S. refineries in the first third of the year were ahead nearly 5 pct.

Hedge market values, meanwhile, were being depressed by anticipated liquidation of nearby long positions on the N.Y. Commodity Exchange during the final weeks of the first half, as well as by the seasonal drop in industrial demand. There also was some concern about the effect of continued high rates of imports of copper and brass mill products on the shrinking base of domestic copper and brass fabricating capacity.

Zinc shipments are up smartly this year, reflecting better demand for die casting grades, particularly in the automotive sector where zinc is pushing to recover applications lost to plastics and aluminum. Demand for galvanizing grades also was firmer. Domestic slab zinc production is up this year, but smelters' inventories trended downward, nonetheless, to a level generally under average monthly shipments.

Shrinking inventories of nickel on the LME and in producers' hands helped push the LME nickel price from \$2.17 at the end of 1984 to nearly \$2.60 a lb by late May—an increase of nearly 20 pct. In terms of sterling, however, the LME price was up only 8 pct.

U.S. stainless steel producer shipments, however, were off only minimally earlier this year. This has reinforced the expectations of the nickel suppliers that demand should hold up fairly well in the U.S. and Western Europe this quarter.

AUTOMOTIVE

Automakers predict that both sales and production of domestic cars will drop from 2.2 million units in the second quarter to 1.9 million in the third quarter. Sales of imported cars, however, likely will hover around the 700,000-unit mark in both quarters.

The slower sales of domestic cars in the third quarter combined with nearly full-capacity production will raise dealers' inventories. Dealers had about 50 days' supply of domestic cars at the end of the second quarter; that will rise to about 65 days' worth at the end of the third quarter. As the Japanese increase shipments of cars to the U.S., dealer stocks of imports also are expected to rise—from about 30 to about 40 days' worth in the same period.

Automakers relied heavily on low-interest (generally 8.8 pct) financing to attract buyers in the second quarter. They could continue such discounts in the third quarter. A slight drop in the prime interest rate also has made consumers feel that now is a good time to buy a car.

The University of Michigan's Institute for Social Research (ISR) reports that consumer confidence continues to be at all-time highs. The years 1984 and 1985 will be "the most favorable two-year period for consumer confidence since the mid-1960s," said Richard T. Curtin, head of the ISR's Survey of Consumer Attitudes.

The Michigan survey concluded that 63 pct of American families feel that conditions are favorable for buying a car. Many of the people surveyed mentioned the availability of lower-interest loans for car purchases plus discounted car prices.

The automakers themselves, however, are less sanguine about consumer confidence.

Another big uncertainty continues to be the Japanese. With the end

of the voluntary restraint agreement (V.R.A.) at the end of March, the Japanese began shipping more cars to the U.S. Japanese Prime Minister Nakasone commanded the Japanese automakers to limit U.S. exports to 2.3 million units between April 1, 1985, and April 1, 1986. But U.S. automakers aren't sure that their Japanese competitors will do that.

"I expect the Japanese to ship 2.5 million cars in 1986," said one automaker's economic analyst. "Others expect them to ship as many cars as their distributor network can supply: 2.7 million."

"If the Japanese continue to increase their automotive exports at the same time the U.S. economy slows down, I expect trouble. If the Japanese grab a larger market share of the auto industry here while their overall trade imbalance with the U.S. grows, I think that President Reagan will be forced to act."

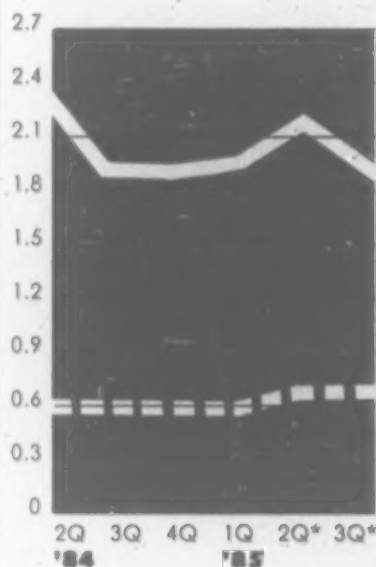
Some expect the Japanese to continue increasing their exports here later this year and next year—even if the U.S. economy falters. Others believe the Japanese will avoid a confrontation and reduce exports if the U.S. economy slows.

Despite the increased Japanese imports, automakers have not begun an all-out price war. "The leading Japanese automakers—Toyota, Nissan, and Honda—are in no rush to start a price war," said one analyst. "They prefer the higher profits of the higher prices. A price war would most likely be started by the smaller Japanese firms as they take advantage of the end of the V.R.A. to increase their market share here."

On the other hand, the analyst noted, "if American consumers think that the influx of Japanese cars has lowered car prices generally, they'll buy not only more imports—but more domestic vehicles as well."

Both sales and production of domestic cars will drop ... to 1.9 million in the third quarter.

Automotive Sales
In Millions of Units



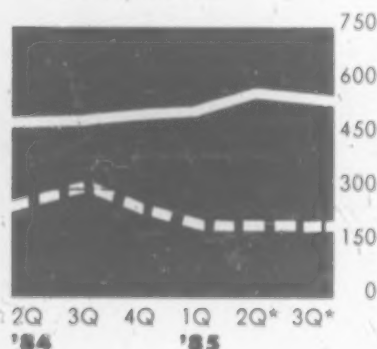
Source: Motor Vehicle Manufacturers Assn.

*IA estimate

MACHINE TOOLS; FLUID POWER

All in all, machine tool builders are optimistic about 1985 and beyond.

**Machine Tools
Net New Orders**
In Millions of Dollars

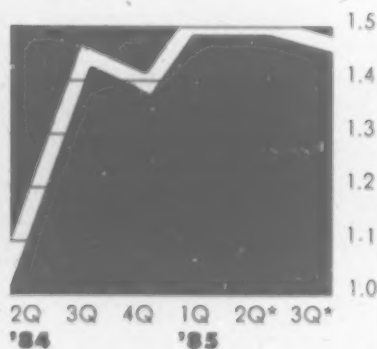


— Metalcutting
- - - Metallforming

Source: National Machine Tool Builders Assn.

*IA estimate

Fluid Power, Shipments
In Billions of Dollars



Source: U.S. Department of Commerce and NFPA

*IA estimate

MACHINE TOOLS—Some machine tool executives believe the industry has peaked in terms of sales for this business cycle. The second half will not be significantly better than the first half.

There is one source of optimism. Detroit. "We've got enough business from GM alone to keep us going at near capacity for at least two years," says one industry leader.

Other U.S. automakers are busy retooling for the next generation of cars and several builders report excellent inquiry and order levels.

While many feel the total American market for American builders has permanently shrunk and perhaps is destined to shrink even more, others note that U.S. machine tool companies that have survived the assaults from offshore are destined to end up with the most profitable portions. "The large systems—the FMSs and automated factory systems which will be used here—will almost entirely be built by domestic builders," predicted one industry expert. "The competitive factors involved in these large systems have far less to do with price than in the case of stand alone machines. The issues are technology, operational success and maintenance. There's no reason at all why U.S. builders can't beat any foreign builder in all these areas, with cost contained of course."

Meanwhile, there are more and more signs that foreign builders are going to increase their presence in the U.S. market. Several companies are up for sale and at least two or three old line names in the industry may be under new ownership before the year is out.

All in all, machine tool builders are optimistic about 1985 and beyond. This is because the major contractions and rearrangements are probably done.

FLUID POWER—Sales of fluid power equipment have slipped since January and are now running below earlier forecasts. A strong auto market, stronger than some sources had expected, hasn't been enough to offset a slow capital goods market.

Materials handling, for example, has been a comparatively good investment sector. Yet one supplier to the lift truck industry pointed out that the impact of imports has skimmed much of that gain away.

The second quarter appears to have run flat, despite a few gains in seasonal industries.

What concerns more and more observers is that the second quarter may be duplicating the first quarter decline, even with the unexpected strength from auto market.

Fluid power normally enjoys less of a third quarter dropoff than most metalworking industries. So it should hold at a little under the \$1.5 billion quarterly average in the first half of this year. Mobile equipment continues to be the weak area. Heavy trucks had been a strong factor through 1984, and deliveries continue to be pretty good, but forecasters now warn that this market, also, is beginning to slip.

As one source put it, "The whole market has moved under original plan and has been almost since the first quarter." At the moment, there seems no reason to expect any significant recovery. Usually, fourth quarter shipments give a little boost to the figures toward the end of the year, but even that has been discounted in some forecasts.

Pneumatic systems, always more volatile than hydraulics, have been tracking at about the same curve as the larger hydraulic market. Some pneumatic suppliers, who had been running at a solid level in second quarter, began to report new softness as June began.

COATINGS; PLASTICS

COATINGS—Industrial coaters expect to ship 86 million gallons in the third quarter. That's fewer than the 89 million gallons they shipped in the third quarter of 1984—and fewer than the estimated 90 million gallons they shipped in this year's second quarter.

The automotive and coil-coating markets were the two markets with the most growth in the first half of this year. "Coil coatings did much better than I expected in the second quarter," said the vice president of one major coater. "Unfortunately, that might have been just a temporary glitch. Coil coating could drop off again later in 1985." Auto sales also will drop off from the second to the third quarter.

Household furniture and business machines were the weakest markets for coatings in the second quarter, said the executive. "There was an oversupply of business machines," he said. "But that market could come back by the end of this year." Metal buildings were another soft market, he said.

Underhood auto components used about 5 pct more coatings in the second quarter this year than in the same period last year. Aluminum extrusions were another growing market for coatings.

But overall, the coaters predict that the rest of 1985 will continue to register fewer sales than in 1984.

"I don't foresee a lot of exciting developments for coatings in the basic industries," said one executive. Farm equipment, one of his company's major customers, will continue to have declining sales in the third quarter, he said.

"I foresee an 8 pct dropoff in sales for the coating industry from 1984 to 1985," said one vice president. "That's the problem with following a record like 1984: It's hard to beat it."

PLASTICS—The plastics industry fell short of its 40 billion lb goal of the sale and captive use of resins in 1984, but only by 0.62 pct. This year, the industry is off to a very good start and, unless something disastrous happens, a 40 billion lb market will be no problem at all.

Actual performance of plastics during the first quarter of this year ran slightly ahead of *Iron Age's* previous prediction. This year's first quarter ran ahead of the same period last year by 6 pct. However, these figures take into consideration the many commodity resins consumed by the apparel industry.

Emerging strongly are engineering plastics and composites, both of which are strong contenders for parts in the metalworking industry. In 1984, 1.1 billion lbs of engineering and specialty plastics and resins materials were sold in this country, an 18 pct increase over 1983 sales.

In the composites field, 2.15 billion lbs of materials were sold. That was a 12 pct increase over shipments in 1983. The big user industries are automotive, construction, corrosion-resistant equipment and the marine industries, with respective increased shipments of 18, 6, 11 and 12 pct. Aircraft and appliances were both up by 16 pct.

According to one producer, the leading grades of engineering plastics in terms of consumption during 1984 were:

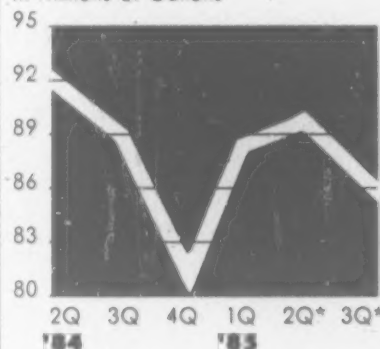
- Nylon (403 million lbs consumed in 1984),
- Polycarbonate (300 million lbs),
- MPPE (175 million lbs),
- Acetal (58 million lbs) and
- Thermoplastic polyester (55 million lbs).

In the third quarter, sales of engineering plastics and composites will continue to grow at rates much faster than plastics in general.

Automotive and coil-coating were the two markets with the most growth in the first half.

Industrial Coatings Shipments

In Millions of Gallons

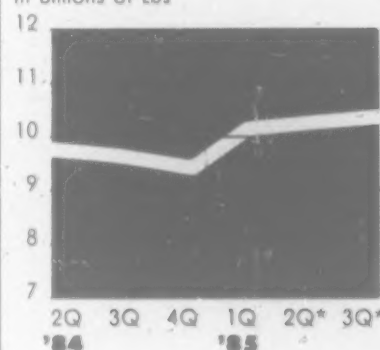


Source: U.S. Department of Commerce

*1A estimate

Plastic Resins Sales & Captive Use

In Billions of Lbs



Source: SPI Committee on Resin Statistics

as compiled by Ernst & Whinney

*1A estimate

COMPUTERS; INSTRUMENTS & CONTROLS

COMPUTERS—In past years, a 20 pct annual growth rate for the computer industry was regarded as inevitable. This year, that string is about to be broken.

It appears that the industry will slip to a growth rate of 15 pct in 1985. This slippage was particularly acute in the second quarter, when several firms announced flat sales.

The slowdown has reached all major segments of the market: mainframes, minicomputers, and microcomputers, including personal computers. Across the board, it seems that the industry is pausing to collect its breath. Firms, deluged with incompatible personal computers, are re-examining their corporate information strategies.

Families are reassessing the value of a home computer. The home market, in particular, has fallen off sharply in recent months.

Sales of the higher priced computers, the mainframes and the minis and superminis, also are suffering as companies make major cutbacks in capital spending. In April, for example, businesses cut capital expenditures by 7 pct.

Mainframe sales, which have been the slowest moving segment of the computer industry in recent years, continue to fall off. Minicomputers, high-selling items until recently, have suffered sharp sales reversals, as firms put automation expansion plans on hold.

Computer manufacturers are hopeful that sales in the second half will pick up, although several see little growth until the fourth quarter. Reportedly, by that time, companies that have delayed their capital spending, will take expansion and modernization plans off hold to meet consumer needs, which remain strong. Second half improvements, however, will not not completely overcome a sluggish first half.

INSTRUMENTS—The outlook continues to be favorable, but with the strong rate of growth of recent quarters moderating somewhat, reflecting a weakening trend in the general marketplace (the first quarter economy grew at a 1.3 pct annual rate after inflation).

The strongest driving force in this product sector's economy is the need to replace instruments and controls due to the obsolescence by technology rather than due to age.

There are many factors influencing this market. The programmable controllers and microcomputers are vastly increasing the capability of devices to measure and control processes. The devices are more accurate, operate at greater rates, are much more responsive, and, where they are programmable, more versatile. The end result is strong desire for modernization and upgrading of facilities to improve productivity to remain competitive.

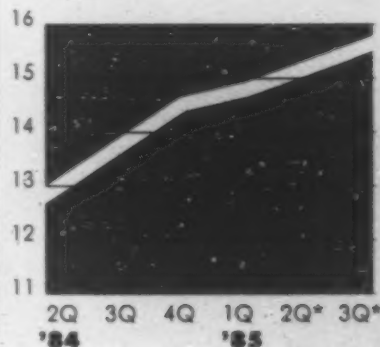
The computer is also enabling industry to pursue simulation at the computer-aided engineering stage to a greater extent than ever before. Simulation techniques allow users to design, construct and test components, for example, on the CRT screen without going through the time and expense of building a prototype for testing and evaluation. In keeping with the trend to 100 pct inspection of manufactured parts, the demand for new technologies equates to increased demand for the latest developments in instruments and process controls for on-going measurement and testing at every step in the production process.

Despite high employment and high consumer confidence and falling interest rates, demand appears to be slackening, momentarily at least, from the increase of 6 pct throughout 1985 projected last year by the U.S. Commerce Department.

Computer manufacturers are hopeful that sales in the second half will pick up.

Computers Shipments

In Billions of Dollars

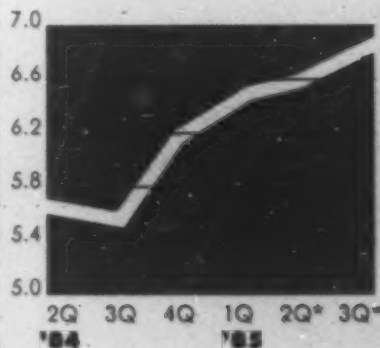


Source: U.S. Department of Commerce

*IA estimate

Instruments & Controls Shipments

In Billions of Dollars



Source: U.S. Department of Commerce

*IA estimate

TUBULAR GOODS; MINING EQUIPMENT

TUBULAR GOODS—Uncertainties plague the oil country tubular goods industry, which, to the chagrin of domestic manufacturers, remains dominated by imports.

One of the largest unknowns concerns the effect of the two-year agreement limiting pipe and tube exports that was reached in early 1985 between the U.S. and European Economic Community. Many in the industry expect that by the end of the third quarter, the tremendous gap between domestic and foreign producers should begin to narrow. But the agreement alone certainly will not be enough to eliminate it. And its real effect might not be felt until the final quarter of the year.

The surge of imports actually widened earlier in the year because of a provision in the agreement that 65 pct of the 263,000 tons of imported pipe and tube that had been embargoed would be counted toward the 1985 quota figure. Much of the embargoed product was released early in the year, industry officials say.

But imports are actually just one problem facing the industry. The worldwide overcapacity of steel and the strength of the U.S. dollar continues to hurt domestic producers.

Another problem is the uncertainty surrounding world oil prices. Some observers expect price cuts in the overseas market during the third quarter. This would further depress domestic offshore drilling.

In addition, the oil drill rig count, an important barometer, has been sliding. The figure dropped steadily from 2,452 in January to 1,865 in the beginning of June, more than 17 pct behind last year's pace.

Projections are that the rig count will continue to lag last year's pace in the third quarter. Many industry officials have scaled back more optimistic predictions made earlier this year by 10 to 15 pct.

MINING EQUIPMENT—Mining equipment manufacturers have watched one of their major markets steadily decline for the past few years. They expect the contraction in iron ore mining to continue through 1985 as the domestic steel industry reels and shrinks in the face of foreign products. "I doubt if you'll see an iron ore mine enlargement, let alone a new iron ore mine put in in the continental U.S. ever again," said one industry expert.

"This, of course, has translated into zero business in terms of stacker reclaimers, grinding machinery and other iron ore mining technologies," he added. The "final size" of the iron ore mining industry will be about 60 million tons, he predicted. Some see an even smaller industry.

Other markets for mining equipment makers are certainly not so gloomy. Coal mining has been steady in recent years and quite possibly could ride a high tech horse into a future boom. Various research projects imply an eventual solution to the pollution problem in high sulphur coal. This would open up the Appalachian coal seams again to major utility use throughout the Eastern U.S.

Meanwhile, Appalachian coal usage, albeit with expensive electrostatic precipitator technology, has continued and equipment makers have been reporting a business-as-usual world in their industry.

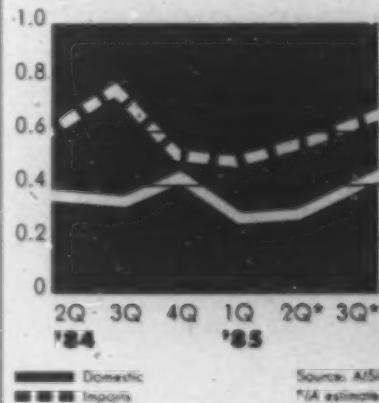
Other metals mining markets are temporarily as bad as iron ore due to a slump in demand. Copper mines, here and in Africa, are as quiet as iron ore mines today. Few expect the yellow metal to make a comeback for at least a year.

All in all, the mining equipment manufacturing business is about as depressed as it ever has been. "Even the Depression wasn't much worse," said one industry source.

The drill rig count, an important barometer (for the tubular goods industry), has been sliding.

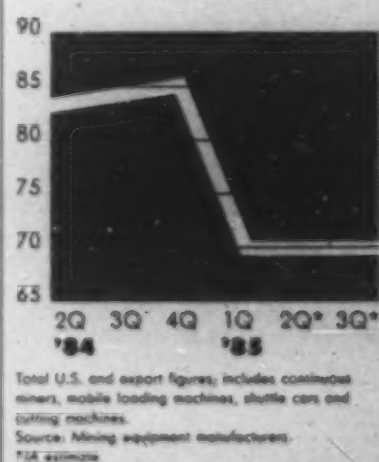
Tubular Goods Shipments

In Millions of Net Tons



Mining Equipment Sales

In Millions of Dollars

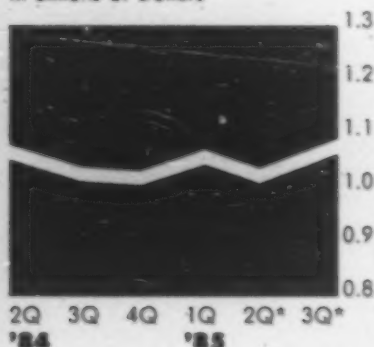


CONSTRUCTION; FARM EQUIPMENT

The (construction equipment) industry's gains have varied widely by geographic areas and by types of equipment.

Construction Equipment Shipments

In Billions of Dollars

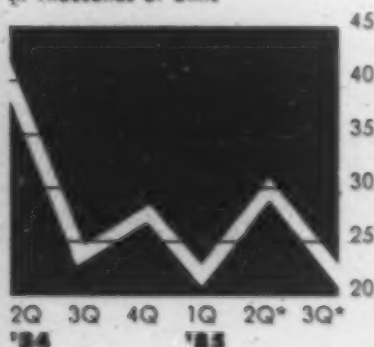


Source: U.S. Department of Commerce

*1A estimate

Farm Equipment Wheeled Tractor Sales

In Thousands of Units



Source: Farm & Industrial Equipment Institute

*1A estimate

CONSTRUCTION—While the recovery in construction machinery has been reasonable on a quarter-to-quarter basis, it hasn't generated a lot of new business for industry suppliers. The gain in the first quarter of this year was pegged at about 5 pct over the fourth quarter 1984. That's an improvement, but only about half the seasonal gain usually expected for this quarter.

Some equipment builders report that second quarter sales were better. Some advanced 20 pct, about par for what is usually the strongest shipping season for the industry.

One of the brighter spots has been light machinery, helped by a sturdy housing market. It bobbed up and down but averaged out to a fairly good figure when compared with the heavy machines that draw the big sales dollars.

Overall, the industry's gains have varied widely by geographic areas and by types of equipment. Highway construction equipment has continued relatively good, but some other areas are not producing the business that had been anticipated.

Another continuing problem: imports. This hit heavy equipment hard, and items like motor graders suffered. The highway program has been good, but payments there were slower in coming out into the field than was expected.

Contractors have been tight on money, partly due to that. At any rate, they've shown more of a tendency to rent equipment or add used equipment, which also cut into the second quarter sales potential.

For the third quarter, the industry faces a normal seasonal drop that will probably pull down shipments by about 6 pct below the second quarter figure. It should be noted that some forecasters are already shaving back their 1985 full-year forecast by about one-third.

FARM EQUIPMENT—Farm machines, hit by a combination of imports and poor domestic markets, continue to struggle on the bottom rungs of the manufacturing ladder.

Many industry members expected sales to rise this year. Now, according to a recent survey by the Farm & Industrial Equipment Institute, its members felt that 1985 sales will be off 5 pct from the low totals of 1984.

Both combines and tractors, which generate the industry's big dollar volume, were hit in 1984, and are suffering even more in 1985. Through April, total farm tractor sales were down 6.7 pct, but the big four wheel tractors were off 48.3 pct in what was a recovery year for the rest of the economy.

Second quarter normally sees the strongest gain of the farm equipment year, as measured in retail sales. That seasonal impetus will probably bring up sales in second quarter, when the final results are in, to about 30,000 tractors. From there, the movement through third quarter is again downhill, with sales usually falling about 25 pct below the second quarter levels.

At the best, the third quarter this year would be at 22,250. Making the problem worse is that other lines of equipment often begin to pick up in that period, but almost all lines of farm machines, including forage tillage machines, are looking equally bleak for the rest of the year.

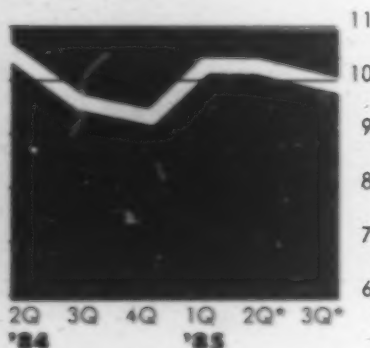
The fourth quarter usually sees a slight seasonal recovery, but not enough to save what is proving to be the worst year in the 1980. There isn't much reason for farm machine builders to raise schedules in anticipation of a fourth quarter sales gain.

Only light industrial equipment, used in the housing market and industrial markets, offers some relief, but not enough to help the heavy equipment plants for this industry.

APPLIANCES; MATERIAL HANDLING

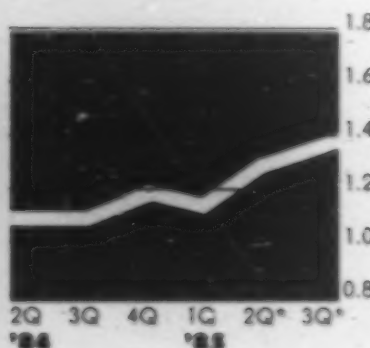
Optimism within the appliance industry is based on the knowledge that there is a strong replacement market.

Appliances, Shipments
In Millions of Units



Source: Assn. of Home Appliance Manufacturers
*1A estimate

Material Handling Shipments
In Billions of Dollars



Source: Material Handling Institute
*1A estimate

APPLIANCES—The latest year-end results indicate that total factory shipments for 1984 were 39.4 million units, setting a new annual record with shipments exceeding the previous record set in 1973 by 3.6 million units.

The record-setting pace continued into the first quarter of 1985 when another record was set: 10.2 million units were shipped by members of the Association of Home Appliance Manufacturers (AHAM). This was the largest first-quarter shipment in history. It was also 5.8 pct higher than the prior first-quarter record set in 1984.

Will the momentum continue? Apparently it will. By the end of April, the year-to-date shipment figure was 13.8 million units, up 7.4 pct over the like period of 1984. By June, AHAM revised its projection for 1985 upwards, from 39.8 million to 40.3 million units.

Much of the optimism within the appliance industry is based on the knowledge that there is a strong replacement market which should keep demand for appliances strong for some time. They see 80 million out of 400 million major appliances as being ripe for replacement. And, the demographics are favorable; 43 pct of Americans over 18 will soon be in the important 25—40 year old bracket that buys many appliances.

Exciting new products that have considerable sophistication, with microcomputers, electronic solid state controls and visual displays are appealing to buyers. Innovations in appliance configurations, such as the over and under dryer/washer, have also attracted many customers.

The home building market appears to be strengthening at this time due to lower mortgage rates and continued high levels of consumer confidence. Home modernization projects are also increasing.

MATERIAL HANDLING—Material handling companies are reporting a continuing upswing in orders as the first half ends. With few market niche exceptions, the industry is still on the rise.

"We've had some very good business so far this year and expect the rest of 1985 to be even better," said one large systems manufacturer. "In fact, this year could be one of the great ones," he added.

Major markets for AS/RS (automatic storage/retrieval systems) such as automotive, food and beverage, and aerospace have been providing high levels of business activity for the large systems companies.

"We expect no major downturns for at least the rest of 1985," said another systems industry leader. "Of course, we have not got the import problems that some others in material handling have." He is referring to one area in the domestic material handling business that is not all smiles: industrial trucks.

Lift truck companies and other special vehicle makers have been fighting what may be a losing battle with foreign suppliers for several years and a few have already joined forces with their former competitors. That trend is expected to continue leaving less and less of the domestic market for factory trucks to domestic manufacturers.

As for the rest of the year, most material handling systems industry managers are predicting steady rises in business activity and no serious downturn for quite some time, perhaps not until well into the second half of 1986.

"There's still a lot of pent up demand out there for our kind of system. Given the very low inflationary expectations of today, we're betting on a very good second half and possibly an equally good 1986," said one leading crane executive.

CASTINGS; FORGINGS

CASTINGS—Despite an unexpected strength in auto castings volume, the ferrous castings market has slipped. And the betting among foundrymen now is that the third quarter, which falls seasonally about 10 pct, will drop all of that and maybe a hair more.

The culprit is the slow gains in capital goods markets. And, for the first time since the recovery began, the demand from refrigeration markets—tied to the consumer segment of the economy—showed slippage.

Another bower of strength in 1984 has also faded back. Heavy trucks are a good tonnage market, but a number of sources report that this is looking softer and they are beginning to revise their forecasts downward a few percentage points.

Farm equipment, normally a good second quarter castings market and pretty fair even in the early summer, is still slipping. Construction machinery, though in better shape than farm machines, is through its strong buying season and can't give much market support to castings sales.

On the plus side, some producers of large castings used in heavy process machinery report a pickup in recent weeks. That market has been lagging in the recovery. Other areas, like soil pipe and pressure pipe, are doing well, and ingot molds are at least holding. Another process market, pumps and compressors, has also been a strong performer, though the recent drop in refrigeration orders should rob some of the power from this market.

In the nonferrous castings, copper and brass seems to be holding relatively better than other metals though a few foundries reported a slight softening in the second quarter. Aluminum slipped a little more widely in the second quarter and is expected to drop off again in the third and fourth quarters.

FORGINGS—Last year was a so-so year for the forging industry. Expectations were that this year would be much of the same.

However, through the first half of 1985, the industry sales have slipped badly. It will take a miracle in the second half for forgings producers to approach last year's sales totals. There is little evidence that this will take place.

Orders for impression die forgings booked through the first quarter of 1985 were down 22 pct. Preliminary figures indicate that the second quarter saw a similar decline. The weakening sales are not restricted to a few customer groups. Nearly all markets are off.

Because of a great influx of goods from overseas, due primarily to the strength of the dollar, U.S. producers are losing sales to foreign firms (even as they increasingly look overseas for capital equipment for themselves). The public, on the other hand, encouraged by lower interest rates, continues to buy goods like cars. Sales to auto industry remain the one bright spot for the forging industry. Unfortunately, some 37 pct of the forgings in the cars Americans buy come from overseas.

If automotive manufacturers continue to buy forgings, few others are. Forging orders for industrial machinery and engines has fallen off. Sales to manufacturers of off-highway equipment, farm machinery, oil field goods and aerospace products remain bleak.

Even defense-related orders have fallen off this year, a surprise because of the current Administration's commitment to defense.

As a result of several depressing years and an excess of forging capacity worldwide, a substantial number of forging companies are up for sale, greatly reduced in size, or out of business.

Some producers of large castings used in heavy process machinery report a pickup in recent weeks

Ferrous Castings Shipments

In Millions of Tons

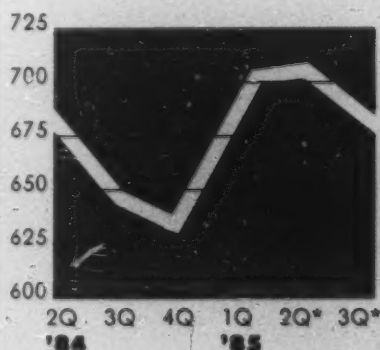


Source: Forging Industry Assn.

*1A estimate

Impression Die Forgings Shipments

In Billions of Dollars



Source: U.S. Department of Commerce

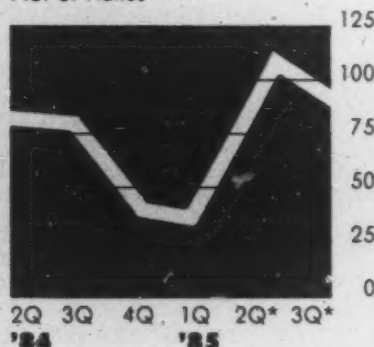
*1A estimate

AIRCRAFT; ENGINES & TURBINES

The domestic aircraft industry still is being buffeted by intense competition for sales

Commercial Airplane Orders

No. of Planes

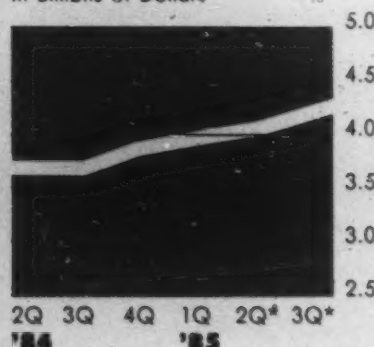


Source: Airbus Industrie, Boeing and McDonnell-Douglas

*1A estimate

Engines and Turbines Shipments

In Billions of Dollars



Source: U.S. Department of Commerce

*1A estimate

AIRCRAFT—The aircraft industry finally appears headed toward clear skies. Last year's economic recovery appears to have taken firm hold in the industry, resulting in improved airline passenger traffic growth and improved profitability. Both the general recovery and growing airline passenger traffic is projected to continue into the third quarter, though perhaps at a somewhat slower pace than it has so far this year.

Nevertheless, the aircraft industry is expected to greatly benefit as more airlines move to replace aging fleets with new-generation, fuel efficient airplanes. Also lending momentum to the upward trend are softer airline fuel prices and recently negotiated employee wage concessions. Another positive sign: The improvement in traffic growth has essentially absorbed the excess capacity which plagued the airlines in recent years.

It's no coincidence that many airlines responded in the second quarter by placing large orders for replacement aircraft. China, which is restructuring its entire internal airline operation, finalized orders for 26 new Douglas airplanes in April and eight Boeing aircraft in May. Air France placed an order in the second quarter for 25 new-generation Airbus A-320 airplanes.

The trend toward large replacement orders should continue in the third quarter. At least two foreign airline carriers and an international leasing agency are set to finalize substantial new orders.

The domestic aircraft industry still is being buffeted by intense competition for sales, especially from foreign manufacturers like the Airbus European consortium.

Discounts and special leasing arrangements should continue for the short term. But the overall trend is decidedly upbeat.

ENGINES & TURBINES—The gradual improvement evident for several quarters in this wide-ranging industry is expected to continue into the third quarter of 1985. The long-standing economic recovery has positively impacted several important segments of the engines and turbines industry. But recovery in other segments, especially in the utilities area, has been dragging. This trend also is expected to continue through the end of the year.

To be sure, this industry has greatly recovered from the precipitous drop in orders that occurred in 1983. The automotive sector has strongly rebounded. Lower interest rates should continue to aid this area in the third quarter. The drop in interest also has boosted the construction segment. Both of these areas should perform well through the end of the year.

Uncertainty surrounding newly introduced federal tax proposals and their impact on the construction trade could bring difficulties, however. The growing federal deficit also could cause interest rates to begin climbing in a few months, spelling renewed difficulties for the automotive and construction areas.

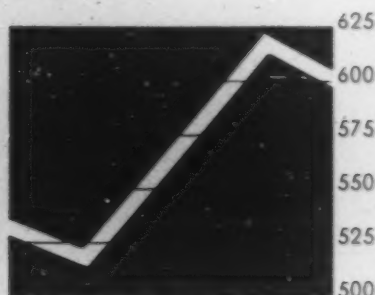
The continued overcapacity in the consumer electrical power market has continued to cast a pallor over the entire industry. The long-term softening in world oil prices has caused the oil segment to remain sluggish. Expensive purchases of items like large diesels and power plants have been forestalled for several quarters. These trends show no sign of reversing until well into next year, and then only if the economic recovery sustains itself.

The industry has slowly been gaining steam, especially in the consumer area. But there has been no large increase in consumer or industry demands for electrical power.

WELDING; HEAT TREATMENT

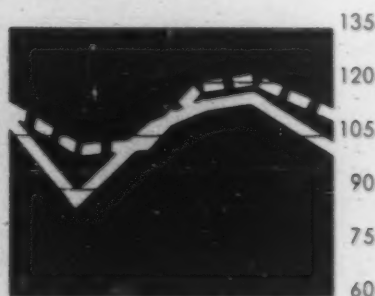
Business at the (welding) distributor level is at an all-time high

Welding Shipments



Index: 100=\$200 million in distributor sales
Source: National Welding Supply Assn.
*IA estimate

Heat Treatment In Millions of Dollars



— Sales of Commercial Heat Treaters
— Heat Processing Equipment Orders
Source: Industrial Heating Equipment Assn., Metal Treating Institute
*IA estimate

WELDING—Some analysts are saying that the welding industry has never had it so good. Others claim that there's really nothing much to write home about. The truth, it seems, lies somewhere in between.

Cause for the optimism is based on activity of thousands of small fabricators, most of which are served by welding distributors. According to the National Welding Supply Association (NWSA), Philadelphia, business at the distributor level is at an all-time high. April was the best month since the NWSA began compiling statistics in 1981.

The story is quite different over on the other side where the welding manufacturers are dealing directly with the large users of welding equipment and consumables. As an executive of one leading welding equipment manufacturer put it: "Business is fairly flat among the bigger industries."

Mechanized welding has passed and is beginning to pull away from the stick electrode in sales volume. This trend is noticeable among both the large and small-sized customers. Both welding manufacturers and distributors are enjoying increasing sales in Tig welding equipment, and the distributors in particular are seeing tremendous growth in equipment in general.

The NWSA cites a 19 pct growth in equipment sales from February to March. Then, from March to April there is another 12 pct jump in equipment sales.

Before the figures were in for the first quarter of 1985, the best quarter in NWSA record-keeping history was the fourth quarter of 1984.

The second quarter of 1985, once the numbers are compiled, should show a 7 pct improvement over the record-breaking first quarter, but there will be a slight seasonal dip in the third quarter.

HEAT TREATMENT—Heat treaters continued their strong performance in the opening months of 1985. For the third quarter, however, seasonal factors should bring heat treater activity off about 10 pct from the strong levels of first half.

Heat treating, as an industry, tends to lag behind many other manufacturing industries in an upturn. But it also enjoys a long run when other industries begin to slow.

Outsiders will perhaps question reports that first quarter activity for heat treaters was up 14 pct over the preceding quarter.

And for some with a lot of farm and construction machinery accounts, that would seem pretty high. But some heat treating shops reportedly were running more than 20 pct ahead of the close of 1984 by the middle of the first quarter of 1985.

Surprisingly, some reports indicate that a few that did slough off a bit in the first quarter, but came back again in the second quarter. The overall figures for industry sales in the second quarter are likely to run almost flat with the first quarter totals, or at best up just a few percentage points.

Auto is still carrying the big market load, but there seems to be increasing interest in aerospace and defense markets, even though some say the area hasn't come along as fast as they'd hoped.

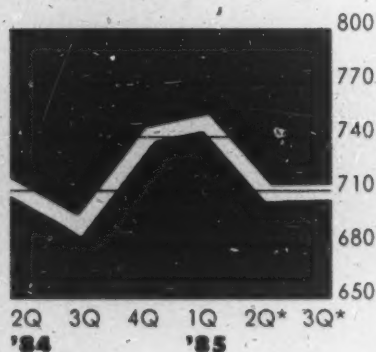
The good performance of the heat treaters carries over into the industrial heating equipment market as well. Like total heat treating orders, equipment orders tend to peak late in a recovery, as happened in 1981, and the current reports on dollar volume show the best numbers since that period.

There's also some feeling that, even with some dropoff in third quarter in order rates, the year could finish at a strong level.

FASTENERS; GEARS

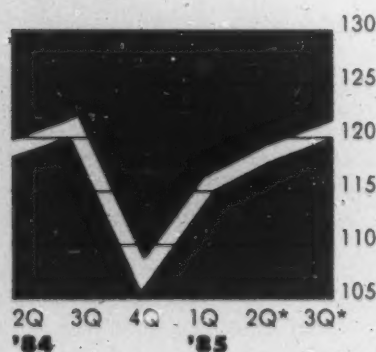
The continuing good order level from auto companies is keeping many fastener companies busy.

Fasteners, Sales
In Millions of Dollars



Source: Industrial Fasteners Institute
*1A estimate

Gears Bookings



Based on average monthly bookings, 1977 = 100
Source: American Gear Manufacturers Assn.
*1A estimate

FASTENERS—Fastener makers expect the second half of 1985 to be down by perhaps 5 to 10 pct in total sales volume from the first half. Still, the continuing good order level from auto companies is keeping many fastener companies busy.

Meanwhile, the share of the market captured by offshore companies has reached record levels in standards and is expected to continue growing. "I wouldn't be surprised if you'll be unable to find a domestic producer of standard nuts and bolts by the end of the decade," predicted an industry expert.

Others in the industry point out that there has been some recent discussion in the market about quality problems with foreign suppliers. "The issue of price is no longer the only issue even with standards," said an industry member. "We're hearing from some customers about quality control as well."

Specials producers, on the other hand, are so far enjoying relatively import-free business. "The first half for us was very good and we expect only a moderate decline in the second half," said one specials company president. "It's difficult to import truly engineered fasteners. The quality issue is supreme."

Further optimism for specials makers as well as those still in the domestic standards end of the business comes from the continuing military buildup. "There's already enough business in that pipeline to carry a company like ours for two years," said one specials maker.

Others say that the "shakeout" in the industry isn't over yet and that a few more domestic companies are destined to leave the business before the end of 1985. "Our industry's legitimate market size is perhaps 65 pct of what it was six or seven years ago. I don't think we're there yet," said one industry source.

GEARS—While the general economy may be hanging its head a little now, some gear industry officials sound a bit more optimistic.

One industry observer believes third quarter sales could be up by 10 pct, and that the gain could carry over into the fourth quarter.

But a Midwestern gear executive, admittedly conservative, feels this should be more like 5 pct and noted that the current operating rate in the industry is running around 65 pct.

Meanwhile, figures from the American Gear Manufacturers Assn. indicated that both bookings and shipments dipped a bit in April.

Still, if the market is going into a higher gear, so to speak, one gear industry official suggests that both the military and the consumer are providing the push. Demand in the industry traditional capital goods markets—oil, mining, farm equipment and chemical—is flat.

But industry members report automobile companies are spending and are expected to do so through year-end. Sales to the appliance makers is also reported to be active.

Sales to the aerospace industry and ordnance manufacturers remain strong, thanks largely to the Reagan Administration's defense budget.

Moreover, service parts business is stronger than gearmakers had anticipated earlier, but gear sales to construction equipment manufacturers are expected to remain "soft."

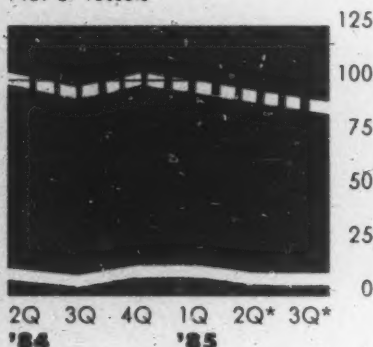
Of course, talk with many gearmakers and exports emerge as their continuing. Excedrin headache. The strong dollar keeps many in the domestic industry from competing with the foreign gearmakers.

The American industry's export situation was painfully bought home to one gear official after his recent trip to West Germany, which is enjoying a strong export market in both South America and India.

SHIPBUILDING; RAILCARS

**Naval shipbuilding
is still moving
full steam ahead**

Shipbuilding
No. of vessels

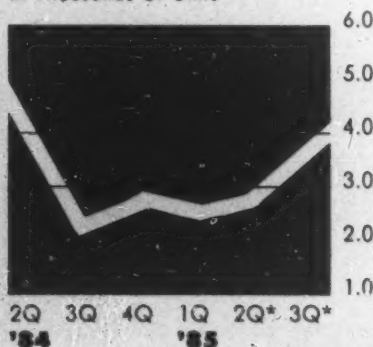


— Commercial, 1,000 gross tons or over
- - - Naval, 1,000 light displacement tons

Source: Shipbuilders Council of America

*1A estimate

Rail Car Orders
In Thousands of Units



Source: American Railway Car Institute

*1A estimate

SHIPBUILDING—Naval shipbuilding is still moving full steam ahead; this is important because 80 pct of all domestic shipbuilding is for the U.S. Navy.

The number of Navy vessels under construction, of 1,000 light displacement tons and over, peaked at 100 in the fourth quarter of 1984. The figure dropped to 96 in the first quarter and will drop further to 90 and 86 vessels, respectively, in the second and third quarters.

That can be deceiving, though, because overall Navy appropriations are increasing. Work started on a \$1.2 billion DDG-51 guided missile destroyer during the second quarter. Work is also expected to start up in the third quarter on a \$1.7 billion Trident ballistic missile submarine.

As far as the number of ships under construction are concerned, 11 Navy vessels were completed during the second quarter of 1985, but fabrication began on five new ones. Twelve more Navy ships will be completed during the third quarter, while work will start on eight new vessels, including one TAO oiler. Work began on two other oilers in the second quarter.

The number of commercial ships under construction (1,000 gross tons or over) held at 10 vessels during the fourth quarter of 1984 and the first quarter of this year, then dropped to seven vessels where it is expected to remain into the third quarter.

Drill rig construction, which is only a shadow of its former self, is showing signs of coming back to life. According to the U.S. Department of Commerce, drill rig construction peaked at 81 units in 1981, then dropped down to three in the fourth quarter of 1984. Drill rig construction is now up to four units and there's hope for more before the year is out.

RAIL CARS—Off to a slow start, it would appear that 1985 will be no banner year for the rail car industry. Yet, the U.S. Dept. of Commerce did predict a better year than 1984, so business is bound to improve, but maybe not until the third quarter. It seems that rail car production has some catching up to do.

The first quarter exhibited a slight drop from fourth quarter 1984 production. In the fourth quarter, orders were taken for 2,854 rail cars, then dropped to 2,606 in the first quarter of this year. We are looking for orders in the second quarter to bounce back to the level of the fourth quarter, then enjoy a spurt in the third quarter.

In its *U.S. Industrial Outlook*, the Commerce Department was predicting that orders would double this year over 1984. If that prediction is on target, rail car orders would still only be about one-half what they were in their peak years.

Here's a rundown of first quarter statistics as of April 1, according to the Association of American Railroads, Washington. This year's new cars ordered (2,606) was well under the 5,472 ordered in the first quarter a year ago. Car deliveries were 2,585 this year, compared to 1,837 during the first quarter of 1984.

The figures for new cars on order and undelivered are as follows: 4,169 this year, compared to 6,375 in the same period, 1984.

Freight traffic on major U.S. railroads during the week ended May 18 totaled 17.6 billion ton-miles, 2.0 pct below the corresponding week of 1984. Carloadings totaled 389,296. Loadings of motor vehicles and equipment were up 9.2 pct over the same period last year.

Cumulative volume for the first 20 weeks of 1985 was an estimated 342.4 billion ton-miles, down 3.6 pct from last year's period. □

1st QUARTER EARNINGS

STEEL IN THE RED; NONFERROUS OFF

BY GEORGE J. MCMANUS AND ROBERT REGAN

Price weakness played havoc with the balance sheets of both the steel and nonferrous metals producers in the first quarter. Shipments rose, but earnings slid for many of the major producers.

STEEL

The steel industry's war of attrition produced another casualty in the first quarter.

Wheeling-Pittsburgh Steel Corp. went bankrupt. Contributing to Wheeling-Pittsburgh's failure were operating losses of more than \$11 million in the first quarter and nearly \$37 million in the fourth quarter of 1984.

In the race for survival, United States Steel Corp. was among the leaders. U.S. Steel was the only one of the five largest mills to report a net profit in the first quarter.

Not surprisingly, sales and earnings of most steel companies were down from the first quarter of 1984. Steel shipments fell from 19.4 million tons in the first quarter of 1984 to 17.9 million tons in this year's first quarter.

However, steel shipments were up by nearly 2 million tons from the fourth quarter of 1984. It might have been expected that the added volume would bring significant profits gains. That didn't happen and the problem continued to be prices that were below costs.

Inland Steel Co. said there was little or no change in its price realization in the first quarter. Others said price cutting had intensified and there was a further weakening in the second quarter.

A quick check of market shares provided little guidance on the sources of price weakness. U.S. Steel's share of total industry shipments was down slightly from the first quarter of 1984. Armco Inc. in-

creased its share. There was no way of knowing if the numbers reflected different product mixes or actual market shifts.

For U.S. Steel, the earnings of Marathon Oil provided a cushion against the ravages of the steel business. The oil dollars helped, but not as much as might be imagined. Marathon's operating profit of \$293 million was down from \$363 million in the first quarter of 1984 and was partially offset by the debt incurred when the oil company was acquired.

Not insignificant was U.S. Steel's first quarter operating profit of \$34 million on 2.9 million tons of steel shipped. That came to \$12 a ton and was up from a steel operating profit of \$4 million in the first quarter of 1984. "These operating results reflect the cost cutting measures we've taken to reduce our break-even level," said David M. Roderick, chairman of U.S. Steel.

Weirton Steel Corp. continued to provide a testimonial to the benefits of employee ownership. Weirton had a net profit of \$10.2 million in the first quarter.

With steel conditions going from bad to worse, the company was profitable in the first five quarters of its independent existence. "Compared to last year's first quarter, profit improved by 5.3 pct, sales by 4.4 pct, and shipments by 3.4 pct," said Robert L. Loughhead, president of Weirton.

Inland Steel had an operating profit on steel of nearly \$6.5 million in the first quarter, but a net loss of \$6.3 million. Although this was a

relatively good showing, Inland was proceeding with a drastic cost cutting and restructuring program. Plans called for reducing salaried employment by 20 pct and cutting steelmaking capacity. Until recently, Inland's strategy was based on a full commitment to steel and to growth for the company in steel.

Interlake had a net profit of \$7 million in the first quarter, but none of this came from basic steel. "Primary metals segment results have been breakeven so far this year," said Frederick C. Langenberg, chairman of Interlake.

Losses continued at alarming rates for LTV Corp., Bethlehem Steel Corp. and Armco. The \$156 million loss of LTV Corp. was due in part to costs associated from the merger of Jones & Laughlin and Republic Steel. The company also cited "extremely unfavorable market conditions in the steel business."

Finally, the merger had the effect of adding Republic's debt and increasing LTV's interest charges from \$44 million in the first quarter of 1984 to \$70 million in the 1985 first quarter.

Bethlehem's net loss of \$62 million in the first quarter reflected the company's almost complete dependence on the steel business. Bethlehem made a major diversification move in March, when it acquired J.M. Tull Industries, Inc., a distributor of metals in the South.

Like LTV, Armco has been laboring under a heavy debt burden. To lighten the load, Armco is selling its aerospace and strategic materials

STEEL: ANOTHER SHOT OF RED INK

FIRST QUARTER PROFIT REPORT—1985 (In Millions of Dollars)

	EARNINGS				SALES		
	1985 E/S	1st Q 1985	1st Q 1984	Pct Change	1st Q 1985	1st Q 1984	Pct Change
USS	1.3	\$58.0	\$171.0	-66.4	\$4,523.0	\$4,636.0	-6.5
LTV	—	(156.4)	(29.0)	—	1,995.1	1,407.0	+41.8
BETHLEHEM	—	(62.1)	(54.6)	—	1,214.0	1,334.0	-9.1
ARMCO	—	(22.5)	56.3	—	919.5	967.8	-5.0
INLAND	—	(6.3)	2.0	—	818.7	850.3	-3.8
NATIONAL	—	(39.8)	(6.1)	—	514.0	576.4	-10.9
TOTAL	—	(229.1)	139.6	—	9,984.2	9,972.4	+0.2
CYCLOPS	1.0	3.1	2.3	+34.8	320.5	291.6	+10.0
WEIRTON	3.5	10.2	9.7	+5.2	295.6	283.1	+4.3
WHEEL-PMH	—	(25.8)	(4.9)	—	241.0	258.9	-7.0
INTERLAKE	3.3	7.0	6.9	+1.5	212.4	212.5	-0.1
NUCOR	9.4	10.2	5.3	+92.5	169.0	152.0	+11.2
CARPENTER	6.9	10.3	11.4	-9.7	147.8	146.4	+1.0
LUKENS	—	(0.4)	(2.5)	—	100.5	91.1	+10.4
COPPERWELD	—	(0.6)	2.8	—	98.9	118.4	-16.5
CF&I	—	(0.4)	(3.0)	—	71.0	73.0	-2.6
QUANEX	2.5	1.8	1.3	+38.5	70.0	94.7	-26.1
FLORIDA	2.1	1.4	3.7	-62.2	69.1	71.6	-3.5
LACLEDE	2.5	1.5	1.9	-21.1	59.1	58.5	+1.1
EASTMET	—	(6.5)	1.6	—	56.2	70.3	-20.1
PHOENIX	—	(1.7)	(3.9)	—	27.0	32.8	-17.7

NONFERROUS: A LUSTERLESS QUARTER

FIRST QUARTER PROFIT REPORT—1985 (In Millions of Dollars)

	EARNINGS			SALES AND OTHER REVENUES		
	1st Q 1985	1st Q 1984	Pct Change	1st Q 1985	1st Q 1984	Pct Change
ALCAN	\$30.0	\$83.0	-63.9	\$1,408.0	\$1,431.0	-1.6
ALCOA	6.7	97.8	-93.1	1,313.9	1,483.0	-11.4
ALUMAX	10.1	37.5	-73.1	450.0	505.0	-10.9
AMAX	(35.3)	8.2	—	547.4	646.0	-15.3
ASARCO	(19.1)	(31.1)	—	260.7	398.6	-34.6
BRUSH WELLMAN	9.8	10.1	-3.0	77.6	80.6	-3.7
CABOT	17.9	25.2	-29.0	547.6	467.9	+17.0
COMINCO	(0.6)	4.5	—	337.6	371.1	-9.0
ECHO BAY MINES	3.0	5.1	-41.2	25.0	20.4	+22.5
ENGELHARD	11.7	(15.7)	—	575.2	642.7	-10.5
FALCONBRIDGE COPPER	(0.5)	0.9	—	26.4	23.7	+11.4
FALCONBRIDGE LTD.	12.2	7.9	+54.4	216.3	168.2	+28.6
FREEMONT MCMORAN	25.7	22.1	+16.3	214.6	202.7	+5.9
HOMESTAKE MINING	3.3	11.3	-70.8	73.4	82.2	-10.7
INCO	12.1	(35.1)	—	384.0	371.0	+3.5
KAISER ALUMINUM	(18.5)	14.6	—	851.6	723.8	+17.7
NEWMONT MINING	3.1	11.8	-73.7	170.6	162.8	+4.8
NORANDA	(9.9)	31.0	—	874.8	874.7	—
QUIN	15.6	27.2	-42.6	540.3	526.5	+2.6
OREMET	1.2	0.3	+300.0	15.0	8.9	+68.5
PHILIPS DODGE	1.6	(5.0)	—	223.6	250.5	-10.7
REVERE COPPER	17.6	13.6	+29.4	122.8	158.8	-22.7
REYNOLDS METALS	7.0	22.3	-68.6	811.4	944.9	-14.1
SHERITT GORDON	1.8	(2.7)	—	116.6	92.1	+26.6
VULCAN MATERIALS	5.0	6.7	-25.4	203.5	202.4	+0.5

Aluminum Co. of America: Net income for the 1984 period includes gains of \$8.7 million from joint venture agreements and \$5.3 million from a real estate transaction. **Alcoa Inc.**: Net income for the 1984 period includes \$7.7 million tax benefit from tax-loss carryforward. **Cominco Ltd.**: Canadian funds. Net loss for the 1985 period is after a \$9.4 million gain from the sale of a subsidiary. **Echo Bay Mines, Ltd.**: Canadian funds. **Falconbridge Copper Corp.**: Canadian funds. **Falconbridge Ltd.**: Canadian funds. Results for 1984 period are restated. **Freemont MCMoran Inc.**: Net income for the 1985 period includes a \$1.034 million gain on sale of a division. **Kaiser Aluminum & Chemical Corp.**: Net income for the 1985 period includes a \$438,000 tax benefit from a tax-loss carryforward.

Losses from discontinued operations were \$701,000 in the 1985 period and \$1,649 million in the 1984 period. **Philips Dodge Corp.**: Net loss for the 1984 period is after \$25 million net income from discontinued operations. **Revere Copper & Brass**: Tax benefits from the tax loss carryforwards amounted to \$4,278 million in the 1985 period and \$4,385 million in the 1984 period. Net income for the 1985 period includes a \$12,839 million gain on the sale of a share mill and related assets and a \$4,365 million loss related to mill restructuring. **Reynolds Metals Co.**: Net income for the 1985 period includes a net gain of \$2.5 million from settlement of litigation. **Sheritt Gordon Mines Ltd.**: Canadian funds.

properties. As fast as it can, the company is terminating some disastrous financial services ventures.

"We have sold our major finance leasing companies, which will enable us to eliminate approximately \$535 million of our financial service business debt," said Robert E. Boni, Armco chairman.

By and large, the non-integrated electric furnace mills fared better than the blast furnace companies in the second quarter. There were, however, wide variations. Among the specialty companies, Eastmet Corp. lost \$6.5 million, Cyclops earned \$3.1 million, and Carpenter Technology Corp. earned \$6.9 million.

Carpenter achieved a 6.9 pct return on sales; Nucor Corp. earned 9.4 pct. Florida Steel continued in the black, but its earnings were down from the first quarter of 1984.

Laclede Steel Co. also remained profitable. Laclede and Bechtel have joined in a study aimed at straightening out ISCOFT, Trinidad's ailing steel company.

With regard to the rest of 1985, no surge in volume has been indicated. Most forecasts now call for shipments of 19 million to 19.5 million tons in the second quarter. Steel producers were hoping a decline in steel imports would prevent a second half slide.

"The President's import restraint program must be put fully in place, and must be enforced vigorously in the months ahead to reduce foreign penetration to the targeted levels for 1985," said Frank W. Luerksen, chairman of Inland Steel.

NONFERROUS

One inescapable conclusion from examination of the first quarter showing of leading North American non-ferrous metals companies is that metals prices weren't high enough to enable them to boost earnings over the initial period of business recovery year 1984.

A notable exception was the nickel business. Inco, Falconbridge and Sherritt Gordon Mines managed significant gains over their showing last year.

Inco credited "somewhat higher" nickel prices combined with lower unit costs. Sales volume of Falconbridge and Sherritt Gordon were up 28.6 pct and 26.6, respectively, while Inco's sales were up a smaller 3.5 pct. London Metal Exchange prices for nickel rose steadily in the first quarter and have continued upward since the start of the second quarter.

The London Metal Exchange price for aluminum remained lodged in a narrow range centering on a low 50¢ a lb during the first quarter and wasn't showing much strength well into the current period. First quarter results of the four leading North American producers were substantially below the same 1984 period and, where increased shipments were reported, the indications were that most of the demand centered on low profit items like ingot and extrusion billet.

Aluminum industry bookings through the first third of this year have been about on par with the same 1984 period, but ingot and billet have been getting most of the play. Import pressures have been retarding prices in the mill product sector.

Producers' inventories have been slow to reflect the production cuts made since late last year, mainly in the U.S. This has had a dampening effect on the price structure for ingot that carries over into the mill product sector as well. Meanwhile, traditional ingot shippers have begun moving up into the lower end of the mill product mix.

Average prices for copper were down in the first quarter from the same 1984 period, but managed to edge upward early in the second quarter. Phelps Dodge managed to squeak out a small \$1.6 million profit, compared with a \$30 million loss (from continuing operations) in the same 1984 period despite the lower copper price. The improvement was attributed to lower unit costs and mining in an unusually high ore grade at the Morenci, Ariz., mine as well as the start-up of a low cost solvent extraction-electrowinning operations at Tyrone, N.M.

Asarco credited a narrowing of its first quarter loss to reduced costs and increased foreign currency translation adjustments. The company noted that average producer copper prices edged higher in the first quarter from the latter part of 1984 and that the gain continued into the current period, suggesting that "copper prices are at last responding to the good demand—substantially in excess of supply—which has prevailed since early 1984."

Ralph L. Hennebach, chairman, noted that Asarco's overall margin on sales of products and services doubled to 9.5 pct in the first quarter despite lower metal prices, sales and processing fees at the company's copper smelters. He also noted that the company's Amarillo refinery would be producing at capacity-plus during the second quarter. This was attributable, he explained, to electric efficiency achieved by the company's Reatrol Process for controlling addition agents in electrolytic refining solutions.

Asarco also noted that copper's slow response to positive factors reflects production policies in Chile, Zambia and Zaire, where output remains at maximum levels and is generating excessive inventories. "Sizeable curtailments of production were forced upon private sector producers in the U.S. and to a lesser extent in Canada," Asarco said. Canada was the number one supplier of imported copper to U.S. consumers in 1984.

Amax cited "continued stagnant or declining dollar prices for most metals" for its \$35.3 million net loss. The company noted that the high reached by the dollar during March saw metal prices recover to record or near-record levels in foreign currencies while remaining depressed in dollar terms.

Reduced aluminum earnings by the company's 50 pct-owned Alumax, Inc., subsidiary reflected lower primary ingot prices. Alumax earnings fell to \$10.1 million from \$37.5 million in the first quarter last year and Amax's pre-tax equity in the aluminum unit's earnings fell to \$7 million from \$28.4 million. □

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective June 10, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	182	181	181	245
Pittsburgh	218	218	199	259
Youngstown	71	81	108	121
Lake Erie	158	136	148	159
Detroit	160	159	153	162
Chicago	469	492	505	503
Cincinnati	94	94	86	109
St. Louis	83	66	57	86
Southern	228	225	236	218
Western	96	97	94	91
U.S. Production	1,759	1,749	1,767	1,953

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered, lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80% premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50%—Pickands Mather as of 1/27/81

86.9%—U.S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82

**Effective 8/1/83.

NONFERROUS PRICES

(Effective June 10, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	48.22	48.72	6/10/85
Copper (C)	66.00-67.00	67.00	6/7/85
Lead	19.00-20.00	20.00	6/3/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	252.18	253.75	6/10/85
Titanium Sponge	555.00-555.00	555.00	4/29/82
Zinc	46.00-45.00	47.00	5/1/85

ALUMINUM, Avg. for last week & previous week. COPPER (C) = cathode. LEAD, common grade. MAGNESIUM, 99.8% pig, delivered. NICKEL, Avg. for last week & previous week. ZINC, high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1,251.55
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$312.00
Indium, dollars per troy oz.	\$2.50
Iridium, dollars per troy oz.	\$440.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$303.00-313.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective June 10, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,759	1,749	39,898	45,337
Capability Utilization Rate	68.6	68.2	68.1	76.6

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base*	27.582	27.582	27.582	27.405
(¢/lb.—off. 7/1/84)				
Pig Iron** (Net ton=2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.***	\$66.17	\$66.83	\$70.17	\$85.17
(Gross ton=2240 lbs.)	\$47.17	\$47.17	\$49.17	\$56.83
No. 2 bundles				

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$70.50	\$70.50	\$72.50	\$94.50
No. 1 steel, Philadelphia	66.50	68.50	69.50	80.50
No. 1 steel, Chicago	61.50	61.50	68.50	80.50
No. 1 bundles, Detroit	59.50	59.50	64.50	87.50
Low Phos., Youngstown	57.50	57.50	57.50	89.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	79.50
No. 1 mach'y cast., Phila	91.50	91.50	91.50	98.50
No. 1 mach'y cast., Chi	99.50	104.50	108.50	117.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$1.29
Palladium, per troy oz.	\$98.00
Platinum, per troy oz.	\$263.50
Rhodium, per troy oz.	\$800.00
Silver ingots, per troy oz.	\$6.085
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

June 3—540.76	June 6—539.07
June 4—539.12	June 7—540.07
June 5—Holiday	

Scrap Prices Brass Mill Scrap

(Cents per lb. over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	63	47
Yellow brass	56 3/4	49 3/4
Red brass	59 1/2	50 1/4
Comm. bronze	60 3/4	50 1/2
Mang. bronze	48 3/4	47 3/4
Free cutting rod ends	49	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	54
No. 2 copper wire	46
Light copper	37

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	50
No. 2 copper wire	42
Light copper	33
No. 1 composition	48
No. 1 comp. turnings	47
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	31
Radiators	39

Aluminum		
New mixed clips	32	— 33
Old sheet	29	— 31
Old cast	29	— 31
Clean dry borings	30	— 31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	26	— 27
Mixed L.C. clips	23	— 25
Old sheets and cast	20	— 22
Borings and turnings	17	— 19
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 38
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	120	— 130
Nickel rod ends	120	— 130
Nickel sheets, clips	120	— 130
Nickel turnings	35	— 45

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

EFFECTIVE JUNE 10, 1985

Effective June 10, 1985. Prices obtained in made based on representative ferrous scrap prices per gross ton delivered to consumer unless otherwise stated. Prices are the property of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry, as the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hot melting	\$ 70.00 to	\$ 71.00
No. 2 hot melting	60.00 to	61.00
No. 1 dealer bundles	79.00 to	80.00
No. 1 factory bundles (asked)	76.00 to	77.00
No. 2 bundles	60.00 to	61.00
No. 1 bushing	77.00 to	78.00
Machine shop turnings	7.00 to	8.00
Shredding turnings	40.00 to	41.00
Cold iron borings	38.00 to	39.00
Low phosph. punchings plate	84.00 to	85.00
Heavy turnings	60.00 to	61.00
No. 1 hot melting	78.00 to	79.00
Rail, 2 ft. and under	95.00 to	96.00
Scrap iron, random light	62.00 to	63.00
Hot iron	99.00 to	100.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	68.00 to	69.00
Heavy breakable cast	58.00 to	59.00
Stainless		
18-8 bundles and solids	425.00 to	435.00
18-8 turnings	525.00 to	535.00

Chicago

No. 1 hot melting	\$ 61.00 to	\$ 62.00
No. 2 hot melting	57.00 to	58.00
No. 1 dealer bundles	73.00 to	74.00
No. 1 factory bundles (asked)	71.00 to	72.00
No. 2 dealer bundles	49.00 to	50.00
No. 1 bushing	72.00 to	73.00
St. order scrap	70.00 to	71.00
Machine shop turnings	13.00 to	14.00
Mixed borings and turnings	34.00 to	35.00
Shredding turnings	33.00 to	34.00
Cold iron borings	39.00 to	40.00
Low phosph. punchings plate	94.00 to	95.00
Low phosph. punchings plate	104.00 to	105.00
Low phosph. 2 ft. and under	94.00 to	95.00
No. 1 hot melting	74.00 to	75.00
Scrap iron, random light	69.00 to	70.00
Knacker cast	90.00 to	91.00
Rail, 2 ft. and under	94.00 to	95.00
Hot iron and knacker	94.00 to	95.00
Hot iron	100.00 to	101.00
No. 1 machinery cast	90.00 to	91.00
Cupola cast	87.00 to	88.00
Steel plate	87.00 to	88.00
Steel cast wheels	85.00 to	86.00
Stainless		
18-8 bundles and solids	535.00 to	545.00
18-8 turnings	455.00 to	465.00
430 bundles and solids	111.00 to	112.00
430 turnings	91.00 to	92.00

Philadelphia

No. 1 hot melting	\$ 65.00 to	\$ 66.00
No. 2 hot melting	58.00 to	59.00
No. 1 dealer bundles	75.00 to	76.00
No. 2 dealer bundles	40.00 to	41.00
No. 1 bushing	74.00 to	75.00
Shredder scrap	60.00 to	61.00
Machine shop turnings	25.00 to	26.00
Mixed borings and turnings	25.00 to	26.00
Shredding turnings	37.00 to	38.00
Low phosph. 5 ft. and under	75.00 to	76.00
Low phosph. 2 ft. punchings	95.00 to	96.00
Electric furnace bundles	80.00 to	81.00
Hot iron	77.00 to	78.00
Rail, 2 ft. and under	97.00 to	98.00
Cupola cast	75.00 to	76.00
Heavy breakable cast	65.00 to	66.00
No. 1 machinery cast	90.00 to	91.00

Detroit

Broken buying prices per gross ton on cars		
No. 1 hot melting	\$ 49.00 to	\$ 49.00
No. 2 hot melting	47.00 to	48.00
No. 1 dealer bundles	59.00 to	60.00
No. 2 bundles	25.00 to	26.00
No. 1 bushing	55.00 to	56.00
Drop forge flashings	38.00 to	39.00
Machine shop turnings	39.00 to	40.00
Mixed borings and turnings	16.00 to	17.00
Shredding turnings	39.00 to	40.00
Cold iron borings	25.00 to	26.00
Heavy breakable cast	35.00 to	36.00
Mixed cupola cast	49.00 to	50.00
Automotive cast	72.00 to	73.00
Stainless		
18-8 bundles and solids	520.00 to	530.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hot melting	\$ 50.00 to	\$ 53.00
No. 2 hot melting	39.00 to	42.00
No. 1 dealer bundles	57.00 to	60.00
No. 2 dealer bundles	29.00 to	32.00
Machine shop turnings	8.00 to	11.00
Shredding turnings	13.00 to	16.00
Low phosph. plate	54.00 to	58.00
Electric furnace bundles	53.00 to	56.00
Consolidated bundles	44.00 to	49.00

Cleveland

No. 1 hot melting	\$ 50.00 to	\$ 53.00
No. 2 hot melting	30.00 to	33.00
No. 1 dealer bundles	55.00 to	58.00
No. 2 dealer bundles	55.00 to	58.00
No. 1 bushing	25.00 to	28.00
Machine shop turnings	55.00 to	58.00
Mixed borings and turnings	18.00 to	21.00
Shredding turnings	10.00 to	13.00
Cold iron borings	15.00 to	18.00
Cut structural & plates		
2 ft. and under	92.00 to	95.00
Low phosph. punchings plate	92.00 to	95.00
Drop forge flashings	43.00 to	46.00
Foundry steel, 2 ft. & under	66.00 to	69.00
No. 1 hot melting	56.00 to	59.00
Rail, 2 ft. and under	63.00 to	66.00
Rail, 18 in. and under	67.00 to	70.00
Steel wire turnings	54.00 to	57.00
Knacker cast	87.00 to	90.00
No. 1 machinery cast	84.00 to	87.00
Cupola cast	83.00 to	86.00
Steel plate	51.00 to	54.00
Deposits		
18-8 bundles	375.00 to	385.00
18-8 turnings	325.00 to	335.00
430 bundles	80.00 to	83.00

Buffalo

Broken buying prices per gross ton on cars		
No. 1 hot melting	\$ 50.00 to	\$ 51.00
No. 2 hot melting	40.00 to	41.00
No. 1 bushing	42.00 to	43.00
No. 1 dealer bundles	42.00 to	43.00
No. 2 bundles	30.00 to	31.00
Machine shop turnings	15.00 to	16.00
Mixed borings and turnings	15.00 to	16.00
Shredding turnings	21.00 to	22.00
Cold iron borings	23.00 to	24.00
Low phosph. plate	77.00 to	78.00
Shredding and plate		
2 ft. and under	79.00 to	80.00
Rail, 2 ft. and under	79.00 to	80.00
Knacker cast	65.00 to	66.00
No. 1 machinery cast	74.00 to	75.00
No. 1 cupola cast	58.00 to	59.00

St. Louis

No. 1 hot melting	\$ 45.00 to	\$ 46.00
No. 2 hot melting	34.00 to	35.00
Foundry steel, 2 ft.	43.00 to	44.00
No. 1 dealer bundles	45.00 to	46.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	12.00 to	13.00
Shredding turnings	18.00 to	19.00
Cold iron borings	28.00 to	29.00
No. 1 hot melting	52.00 to	53.00
Rail, 18 in. and under	65.00 to	66.00
Hot iron	65.00 to	66.00
Hot iron	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Steel plate	86.00 to	87.00
Steel wire wheels	73.00 to	74.00
Refractory	64.00 to	65.00
Unchipped motor blocks	58.00 to	59.00

Birmingham

No. 1 hot melting	\$ 70.00 to	\$ 71.00
No. 2 hot melting	67.00 to	68.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	45.00 to	46.00
No. 1 bushing	71.00 to	72.00
Shredder scrap	84.00 to	85.00
Machine shop turnings	25.00 to	26.00
Shredding turnings	37.00 to	38.00
Cold iron borings	35.00 to	36.00
Electric furnace bundles	66.00 to	67.00
Electric furnace, 3 ft. & under	66.00 to	67.00
Structural and plate, 2 ft.	85.00 to	86.00
Structural and plate, 4 ft.	82.00 to	83.00
No. 1 hot melting	82.00 to	83.00
Scrap iron, random light	77.00 to	78.00
Rail, 2 ft. and under	91.00 to	92.00
Angles and shape bars	83.00 to	84.00
No. 1 cupola cast	82.00 to	83.00
Unchipped motor blocks	75.00 to	76.00

Cincinnati

Broken buying prices per gross ton on cars		
No. 1 hot melting	\$ 42.00 to	\$ 43.00
No. 2 hot melting	39.00 to	40.00
No. 1 dealer bundles	43.00 to	44.00
No. 2 bundles	23.00 to	24.00
Machine shop turnings	3.00 to	4.00
Shredding turnings	5.00 to	6.00
Cold iron borings	12.00 to	13.00
Low phosph. 18 in. and under	75.00 to	76.00
Rail, random length	53.00 to	54.00
Rail, 2 ft. and under	67.00 to	68.00
No. 1 cupola cast	53.00 to	54.00
Heavy breakable cast	21.00 to	22.00
Drop broken cast	68.00 to	69.00

New York

Broken buying prices per gross ton on cars		
No. 1 hot melting	\$ 44.00 to	\$ 45.00
No. 2 hot melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	21.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	5.00
Shredding turnings	10.00 to	11.00
Clean cast steel borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed cast cast	90.00 to	91.00
Heavy breakable cast	10.00 to	11.00
Stainless		
18-8 prepared solids	520.00 to	540.00
18-8 turnings	420.00 to	440.00
430 prepared solids	90.00 to	110.00
410 solids	80.00 to	90.00

Boston

Broken buying prices per gross ton on cars		
No. 1 hot melting	\$ 49.00 to	\$ 51.00
No. 2 hot melting	39.00 to	41.00
No. 1 dealer bundles	51.00 to	53.00
No. 2 bundles	32.00 to	34.00
No. 1 bushing	57.00 to	59.00
Shredder scrap	49.00 to	51.00
Machine shop turnings	18.00 to	19.00
Shredding turnings	10.00 to	11.00
No. 1 machinery cast	75.00 to	76.00
Mixed cupola cast	42.00 to	43.00
Heavy breakable cast	8.00 to	9.00

San Francisco

No. 1 hot melting	\$ 38.00 to	\$ 40.00
No. 2 hot melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	17.00 to	19.00
Machine shop turnings	8.00 to	9.00
Cold iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hot melting	\$ 40.00 to	\$ 42.00
No. 2 hot melting	33.00 to	35.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	13.00 to	14.00
Shredding turnings	10.00 to	11.00
Cold iron borings	8.00 to	9.00
Electric furnace, 1 ft. and under	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hot melting	\$ 60.00 to	\$ 62.00
No. 2 hot melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed pig cast	80.00 to	82.00

Hamilton, Ont.

Broken buying prices per gross ton on cars		
No. 1 hot melting	\$ 71.00	
No. 2 hot melting	63.00	
No. 1 dealer bundles	69.00	
No. 2 bundles	47.00	
Mixed steel scrap	65.00	
Both new fact. scrap'd	71.00	
Machine shop turnings	31.00	
Short steel turnings	31.00	
Mixed borings and turnings	18.00	
Cold scrap	87.00	

Houston

Broken buying prices per gross ton on cars		
No. 1 hot melting	\$ 47.00 to	\$ 48.00
No. 2 hot melting	34.00 to	35.00
No. 2 bundles	40.00 to	41.00
Machine shop turnings	13.00 to	14.00
Crushed turnings	30.00 to	31.00
Shredder scrap	76.00 to	77.00
Cut structural plate, 2 ft. and under	96.00 to	97.00
Cut structural plate, 5 ft. and under	80.00 to	81.00
Unchipped motor blocks	40.00 to	41.00
Cupola cast	84.00 to	85.00

STEEL PRICES

PRODUCER KEY

With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baran Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens, Inc., Coatesville, Pa.

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston

N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Nelsen Steel & Wire Co., Chicago
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Robin Steel Corp., North Tonawanda, N. Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Manaca, Pa.
S10 Seneca Steel Corp., Buffalo, N. Y.

S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh

W3 Weirton Steel Corp., Weirton, W. Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh
W14 Whittar Steel Strip Div., Whittar Industries, Ltd., Detroit

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

	Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled 110 gage	Cold-Rolled 20 gage	Galvanized 116 gage	Hot-Rolled Strip	Plates	Standard Shapes	Hot-Rolled Juniata	Cold Finished	Hot-Rolled A20 As-Rolled	Hot-Rolled A140 Annealed	Cold-Drawn A20 As-Rolled	Cold-Drawn A140 Annealed
	Atlanta	26.73	33.35	34.32	28.05	25.93	22.82	20.60	30.10	32.73	47.49	69.20	71.73
	Baltimore	26.68	31.26	36.45	33.24	31.57	28.09	23.33	34.51	50.01	53.80	63.23	68.52
	Birmingham	25.26	29.80	36.01	28.36	24.31	22.93	21.90	30.41	47.60	55.75	67.68	72.90
	Boston	34.06	40.01	46.21	43.90	32.16	29.30	24.56	34.06	40.34	42.88	54.25	57.37
	Buffalo	30.83	36.17	42.58	36.50	29.52	25.44	20.81	31.38	39.37	40.77	48.90	55.15
	Chicago	28.50	35.40	38.61	25.56	22.48	19.53	18.85	26.11	30.52	38.51	46.56	51.45
	Cincinnati	29.45	35.54	38.49	26.30	23.33	19.48	18.23	27.50	32.54	39.67	46.83	51.43
	Cleveland	28.26	34.70	38.19	33.16	22.48	22.85	19.62	29.49	35.52	39.71	47.08	52.82
	Denver	31.17	37.95	36.91	33.51	26.35	23.80	21.04	36.91	48.83	54.81	65.53	68.73
	Detroit	29.19	35.77	38.94	25.45	23.38	20.10	18.61	27.48	32.43	39.32	46.89	52.03
	Houston	27.44	29.20	32.50	35.63	25.65	25.59	22.29	38.21	44.31	49.74	58.55	64.68
	Kansas City	30.46	37.41	39.55	30.43	26.05	22.96	18.86	32.32	37.93	42.23	49.31	53.41
	Los Angeles	26.80	31.55	37.59	30.38	27.00	31.65	27.14	36.20	49.16	54.01	62.73	69.08
	Memphis	24.11	33.01	33.91	28.31	25.09	23.75	21.20	31.84	35.51	46.81	59.41	67.90
	Milwaukee	28.75	35.14	38.38	27.64	23.53	20.88	18.82	26.29	32.16	39.00	46.05	51.44
	New York	32.15	38.95	43.01	39.80	31.59	24.64	22.02	34.47	40.58	43.90	51.43	54.76
	Philadelphia	27.82	39.40	41.82	39.92	26.95	26.43	22.26	30.28	40.82	44.57	54.65	59.04
	Pittsburgh	39.43	41.21	45.00	39.87	36.50	29.75	27.74	28.61	36.77	41.49	49.48	52.64
	Portland	28.70	31.80	38.35	32.98	33.56	34.05	27.09	39.72	48.09	54.65	70.03	...
	San Francisco	26.70	32.08	37.73	30.55	26.40	29.46	26.71	36.80	49.00	54.54	63.48	68.51
	Seattle	28.00	30.46	37.71	29.37	21.90	27.00	26.70	37.27	51.31	58.55	69.33	73.01
	Spokane	21.04	30.91	36.14	34.44	33.00	33.23	23.00	40.10	41.51	44.46	...	56.86
	St. Louis	28.84	32.19	37.87	31.01	22.84	20.99	19.18	30.43	36.40	40.38	47.45	52.23
	St. Paul	28.60	34.07	36.01	24.78	22.82	31.74	18.68	30.28	35.82	39.55	46.67	51.85

Base Quantities: All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—1.8" x 1"; Plate 1.4" x 84'; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds 3/4-2.15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1.5-8" rounds; Cold drawn—1" round; Hot-rolled A140—1.5-8" rounds; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

Codes identify Producers listed on p. 64. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A. = Not available

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Rerolling, Midwest	
W5	\$366.00
N4	\$366.00
West	
C6	\$346.00
Carbon Forging, East	
B3(2)	\$473.00
C10, U1	\$473.00
R3	\$453.00
Midwest	
R3, W5	\$453.00
U1	\$473.00
S1, I3	\$473.00
C10	\$473.00
K2	\$473.00
West	
C6	\$420.00
Alloy, East	
R3	\$492.00
B3	\$512.00
U1-C10	\$512.00
Midwest	
W5	\$492.00
U1, I3	\$512.00
C10	\$512.00
R3	\$492.00
S1	\$512.00
West	
C6	\$469.00

Structurals

Carbon, East	
B3	22.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3	23.90
T10	23.90
N4	23.90
South	
C16	23.90
T10	22.90
High Strength, Low Alloy, East	
B3	22.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
South	
C16	23.90
Wide Flange, Carbon, East	
B3	22.90
U1	22.75
J3	23.90
Midwest	
U1	22.75
N4	23.90
I3	23.90
Wide Flange, High Strength Low Alloy, East	
U1	24.30
Midwest	
U1	24.30

StripHot Rolled, Carbon, Cut II
Edge—all widths, East

U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1	23.75
U1, A7	23.75
I3, B3	23.75
M2	22.05
R3	22.05

South	
R3	22.05
Cold Rolled, Carbon Max. 25%, East	
E4	29.75
S10	29.60
P15	24.80
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05
High Strength, Hot Rolled, Low Alloy, Cut Edge & Mill Edge, All widths, (plus extras)*	
Midwest	
M2, R3	22.05
W3, J3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05
High Strength, Cold Rolled, Low Alloy, Mill Edge, Midwest	
S1	37.05
Alloy, Hot Rolled, Midwest (plus extras)*	
S1	26.10
I4	25.20
Alloy, Cold Rolled, East (plus extras)*	
E4, M8	43.35
B4	49.75
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot Rolled, Carbon (16 Ga & Hvy)

East	
B3	23.75
J3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5	23.75
S1, B3	23.75
I3, A7	23.75
West	
U1	24.25
South	
R3	22.05
Cold Rolled, East, Class I	
B3(2)	28.15
J3	26.15
U1	28.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.85
J3	26.15
D1	26.15
U1, W5	28.15
S1, B3	28.15
I3, A7	28.15
West	
U1	28.65
South	
R3	24.65
Galvanized (hot dipped), East	
B3(2)	30.30
U1	30.30
Midwest	
J3, D1, W3	28.00
R3, Y1	28.00
G2, M11	30.00
U1, W5	30.30
S1	30.30
I3	30.30
A7	30.30
West	
U1	30.80
South	
R3	28.00
Enameling, Midwest	
U1, S1	29.65
I3, A7	29.65
J3	27.65
Long-Term, Midwest	
W5, A7, U1	31.65

R3	29.35
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Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

 Tinplate

Electrolytic Tinplate, Single Reduced (70 lb)	
East	per base box
J3	26.29
U1	28.99
Midwest	
U1	28.99
J3	26.29
M11	27.54
W3	26.29
W5	28.99
West	
U1	29.49
South	
U1	28.99
Double Reduced (55 lb)**	
Midwest	
M11	21.95
J3	21.49
U1	23.38
W3	21.49
W5	23.38
West	
U1	23.88
South	
U1	23.38
Black Plate, Single Reduced (70 lb)*	
East	
B3	24.81
Midwest	
J3, W3	24.01
I3	24.57
W5	25.55
U1	26.27
M11	26.27
West	
U1	26.27
Double Reduced (55 lb)	
East	
B3	20.49
Midwest	
W5, M11, U1	20.49
J3	18.93
W3	18.93
West	
U1	20.49
South	
U1	20.49
*75 lb—base weight extra \$9¢	
**50 lb—base weight extra \$1.40	

Bars

Carbon Steel, Hot Rolled (Special quality), East	
R3, K3, R5	25.80
J3	25.80
U1	27.05
C10	27.05
B3	27.05
Midwest	
I4	26.00
U1, I3	27.05
R3, T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
T11, S8	31.00
J3(4), I2	31.00
M8, W10	31.00
N1	24.475

R4, B4	33.25
C10	31.00
Midwest	
W10, R3	33.25
J3	31.00
B1	33.45
I2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
West	
R3	37.15
South	
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot Rolled, East	
R5, K3	27.95
R3, J3	27.95
U1	29.20
B3	29.20
C10	29.20
Midwest	
R3	27.95
I3, C10, U1	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold-Drawn, East	
I2	35.20
R3, N1	37.90
R4	37.10
J3, W10, I2	34.85
T11, S8	34.85
C10	34.85
Midwest	
R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
I2	34.85
B5, M9	38.60
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3	23.25
I4, U1	25.75
P2	23.25
J3	26.75
Midwest	
B3	23.25
I3	25.75
J3, A7	22.80
U1, I4, S1	25.75
R3	26.75
West	
U1	25.75
O2	23.00
South	
R3	25.75
U1	25.75
Alloy East	
B3	31.05
U1, I4	33.55
P2	33.55
J3	34.55
Midwest	
B3	31.05
I4, U1	33.55
West	
O2	31.00
South	
U1	33.55

Wire

Carbon Steel Wire, East	
B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

WEAK MACHINERY LINES CAUSE DURABLE ORDERS DIP

It was bad news for machinery builders in April. Sharp declines in their incoming new orders, almost alone, accounted for a 0.2 pct decline in total durable goods orders during the month.

The weak April showing in machinery orders accounted directly for an almost \$2 billion decline in orders received by capital goods producers in nondefense industries.

This year is turning out to be a very disappointing one for capital outlays. Orders received by nondefense capital goods producers in April were down a steep 15 pct just from February.

The good news in orders in April came in transportation equipment and primary metals industries. Orders received by producers of aircraft, missiles and parts were up a stunning 27 pct in April. This was a mix of defense and commercial business that poured in during the month. It was an orders 'bulge' not likely to be sustained at anywhere near that rate in future months.

The step-up in orders received by metals producers in April was shared by both steel mills and nonferrous metals producers. Primary metals producers' orders were up by almost 10 pct.

Still, metals orders have largely been on a plateau for a long time. Note in the table here that metals orders in April 1984 were higher than the latest month's level.

Despite declines and flattening of orders in a number of durable goods lines, inventories have been held in control. Stocks are not building up to the point where future sharp business-slowness cutbacks might have to be made in the months ahead.

Backlogs are holding up well. This is due to orders and shipments moving closely together. Also, it indicates that order cancellations are not coming in at a dangerous pace.

Billions of Dollars, Seasonally adjusted Monthly Total, unless otherwise noted Source: U.S. Dept of Commerce				Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)						
U.S. Industry, Total	1st Qtr.*	\$380.1	\$367.2	\$337.5		
Manufacturing, Total	1st Qtr.*	151.0	146.2	130.0		
Manufacturing, Durable Goods	1st Qtr.*	74.0	71.1	61.3		
Mining Industry	1st Qtr.*	16.2	16.9	17.6		
KEY INDICATORS, Durable Goods Manufacturing						
New Orders	April	99.5	99.7	97.3		
Shipments	April	102.1	102.2	95.5		
Inventories	April	192.5	192.4	178.4		
Unfilled Orders	April	344.7	347.2	339.9		
NEW ORDERS, METALWORKING						
Capital Goods Producers, Nondefense Industries	April	25.3	27.2	26.3		
Capital Goods Producers Defense Industries	April	6.1	6.2	5.1		
Primary Metals, Total	April	11.0	10.0	11.7		
Steel (SIC 331)	April	4.8	4.1	4.7		
Iron & Steel Castings (SIC 332)	April	1.3	1.2	1.4		
Nonferrous Metals	April	4.9	4.7	5.6		
Nonelectrical Mach.-Equip. Industries, Total	April	16.9	18.8	17.2		
Engines & Turbines	April	1.0	1.1	1.3		
Farm Machinery & Equipment (Shipments)	April	0.9	1.0	0.9		
Construction, Mining & Mat. Hdlg. Equip	April	3.0	3.1	2.7		
General Industrial Machinery	April	1.5	1.5	1.4		
Fluid Power Equipment** (Index-1972=100)	April	295.0	282.0	310.0		
Metalworking Machinery	April	0.9	1.1	0.9		
Machine Tools, Total (\$Mill.; Unadjusted)***	April	183.5	279.3	253.1		
Machine Tools, Metalcutting***	April	122.1	227.0	179.8		
Machine Tools, Metalforming***	April	61.4	52.3	73.3		
Electrical Mach. & Equip. Industries, Total	April	14.2	15.9	15.2		
Elec. Transmission Equip. & Ind. Apparatus	April	1.9	2.1	2.0		
Household Appliances	April	1.3	1.3	1.3		
Communication Equipment	April	5.2	6.3	4.5		
Transportation Equipment, Total	April	23.9	22.5	23.1		
Motor Vehicles & Parts (Shipments)	April	16.5	16.2	15.2		
Aircraft, Missiles & Parts	April	6.3	5.0	6.5		
Shipbuilding & Military Tanks	April	0.4	0.6	0.5		
Fabricated Metal Products, Total	April	13.4	13.3	10.9		
Instruments, Total	April	4.9	4.6	4.6		

*Est.—Commerce Dept.; **Source: National Fluid Power Assn.; ***Source: NMTBA.

CHILTON'S

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July 19, 1985

IRON AGE

MANUFACTURING MANAGEMENT

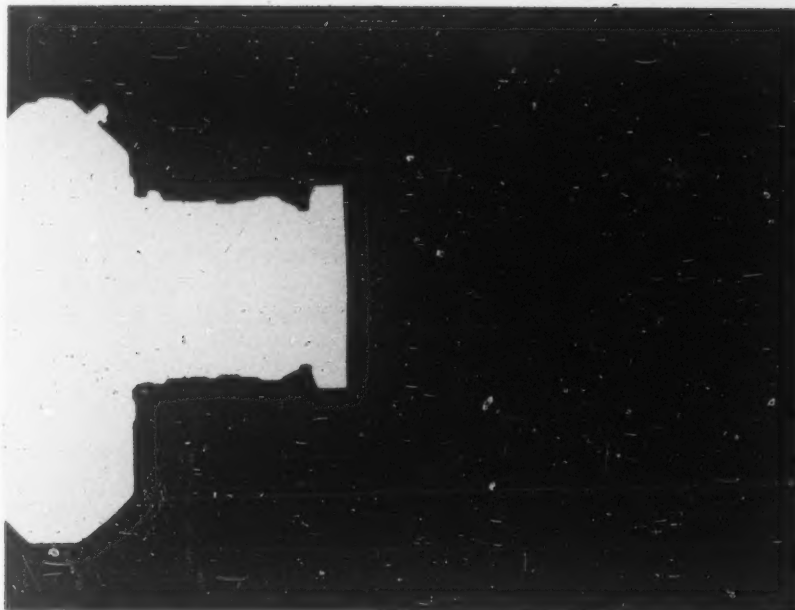
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CASH SHORTAGE NEED NOT STOP EXPANSION

Creative financing, a term that means anything other than cash, is now the way of life in America when it comes to buying plant and equipment. Many firms lease but there are many other sources.

BY GEORGE A. WEIMER

Business intends to spend \$386.1 billion for new plant and equipment in 1985, which is 9.2 pct more than in 1984, according to a survey conducted in April and May by the Commerce Department's Bureau of Economic Analysis. Spending in 1984 was an estimated \$353.5 bil-

lion, up 16.0 pct over 1983.

An ever increasing portion of spending on plant and equipment will come out of "creative financing," a term that means anything other than cash. In fact, cash is fast becoming a rare way to put in a new machine let alone a new plant.

"There are still a few companies that use cash to pay for moderniza-

tions and expansions, but only a few," said Ameritrust vice president Ronald W. Kruse. One major trend, he added, is "the ever increasing use of leasing."

Banks and manufacturers became very interested in this approach in the early 70s as business schools taught the techniques more clearly and as inflation became more promi-

Where Business Borrows (Billions of Dollars)

	1980	1981	1982	1983	1984E
Business Fixed Investment	308.8	352.2	348.3	348.3	400.0
• Structures	110.9	133.4	141.9	131.1	142.5
• Producers' Durable Equipment	197.9	218.8	206.4	217.2	257.5
Selected Sources of Funds					
• New Equipment Leasing	43.5	55.5	57.6	61.2	74.4
• Corporate Equities	12.9	-11.5	11.4	28.3	7.7
• Corporate Bonds	32.9	35.6	34.0	24.4	38.3
• Commercial Mortgages	20.7	-1.1	-0.2	2.9	1.4
• Commercial Bank Loans	29.3	42.8	41.5	17.0	61.0
Selected Sources as Percent of Business Fixed Investment					
• New Equipment Leasing	14.1	15.8	16.5	17.6	18.6
• Corporate Equities	4.2	-3.3	3.3	8.1	1.9
• Corporate Bonds	10.7	10.1	9.8	7.0	9.6
• Commercial Mortgages	6.7	0.3	-0.1	0.8	0.3
• Commercial Bank Loans	9.5	12.2	11.9	4.9	15.2
Selected Sources as Percent of Producers' Durable Equipment					
• New Equipment Leasing	22.0	25.4	27.9	28.2	28.9
• Corporate Equities	6.5	-5.3	5.5	13.0	3.0
• Corporate Bonds	16.6	16.3	16.5	11.2	14.9
• Commercial Mortgages	10.5	-0.5	-0.1	1.3	0.5
• Commercial Bank Loans	14.8	19.6	20.1	7.8	23.7

Source: Compilation and calculations by Brimmer & Company, Inc. Data on business fixed investment from U.S. Department of Commerce, Bureau of Economic Analysis. Data on sources of funds from Data Resources, Inc., based on Flow of Funds data from the Board of Governors of the Federal Reserve System. Data on equipment leasing calculated by Brimmer & Company, Inc., based on the American Association of Equipment Lessors Annual Survey, 1980, 1981, 1982, 1983.

E = Estimate

ment, he explained. Still "leasing doesn't fit when the asset involved diminishes in value quickly, such as was the case of some computers," Mr. Kruse noted.

For purchases of capital goods, however, the leasing approach has radically and pervasively changed the way business invests.

"Equipment leasing is the most important financing alternative available in the U.S. today and is rapidly becoming so in all global markets," said Bernard J. McKenna, president and CEO, Sanwa Business Credit Corp., a subsidiary of Sanwa Bank Ltd., Chicago.

"Three major elements stand out when discussing market changes. These elements are the financial sophistication of customers, the high tech nature of the majority of equipment being financed by leasing companies, and the rise to preeminence of the service industries in the American economy," Mr. McKenna added. It is noteworthy that Mr. McKenna is also the current chairman of the American Association of Equipment Lessors (AAEL) Arlington, Va.

"The high tech nature of the equipment primarily financed by leasing companies has had an impact on the market in recent years. For the last ten years, high tech equipment and computers have been the "The Golden Boys" of leasing in the U.S. This equipment will continue to be important for leasing, but growth is also expected in the leasing of telecommunications equipment such as cellular telephones and of equipment used for electrical and steam generators.

"The increased activity in the leasing of high tech equipment is due in part to the risk of obsolescence. What may be state-of-the-art today may become worthless in five years due to technological improvements. Leasing companies are able to assume this risk selectively due to their experience in the evaluation and remarketing of equipment," the Sanwa president said.

"A leasing company that knows its equipment can predict its resale value with a confidence that allows

it to offer its customer a lower rental rate. The intense competition present in the leasing industry demands that the lessor be up-to-date in its knowledge of the equipment it leases. In-house expertise is a must for all companies with assets over \$50 million," he advised.

A Competitive Environment

Another area of major change in the leasing industry is in the financial environment. In recent years a number of actions have been taken by the United States' government that have continued the deregulation of the financial services industry. "Lessors are now able to do more. However, other financial-service providers can now play our game more easily. With the ease of entry-into and exit-from the industry, competition has increased dramatically in recent years. This increased competition has had an impact on rates and elevated the level of information about leasing available to lessees," Mr. McKenna said.

"With the continued removal of legal constraints on banks and other financial institutions from entering new financial activities, we have seen savings and loans enter into commercial loans and leasing, industrial firms purchase or establish banks, and banks enter into the insurance and securities business."

Growth in participation by non-financial companies has helped to blur distinctions among traditional financial products and product providers. The effect of new entrants in the leasing market has been magnified by a growing trend towards product diversification by established lessors as new opportunities are identified in a rapidly changing environment. These new opportunities have been created by tax law changes and customer needs.

"The leasing industry has responded to these challenges and through its creativity has developed such tools as the leveraged "trac" lease (for trucks and cars), leveraged joint ventures (both for large balance investors and vendors), residual value insurance and the use of interest rate and currency swaps in order to remain flexible and meet the

needs of its customers," Mr. McKenna noted.

In the past four years the United States leasing industry has experienced four major tax changes. Tax reform is now a major issue in the United States Congress.

Based on a study of the original treasury tax proposal by Data Resources, Inc., Mr. McKenna noted that "we can extrapolate a rise in the cost of acquiring equipment of about 10.5 pct." This opinion is supported by businessmen as evidenced in a survey conducted by National Attitudes, Inc. The survey showed that for a large majority of businessmen, current tax credits and depreciation had a positive effect on their decision to acquire new equipment," Mr. McKenna added.

"Leasing is the growth business of the eighties and will continue to dominate the way assets are financed. Leasing in the U.S. existed before the investment tax credit (ITC) and the present depreciation provisions, and will continue to exist because of the creative minds in the industry," he concluded.

Uncertainty Brings Indecision

The possible end of investment tax credit has created quite a stir in both manufacturing and financial circles. Harold C. Hunter, Jr., president of Republic National Leasing Corp., Dallas, Tex., reflected the views of most in industry when it comes to that one aspect of "Treasury II."

The two features of "Treasury II" that will have the most significant impact on equipment leasing are the repeal of investment tax credits and replacement of ACRS with CCRS, Mr. Hunter predicted.

"The ultimate result of repealing investment tax credits and reducing available equipment write offs will be that rental rates will go up. The increase in rates will be significant when compared with leases under current law where investment tax credits are available to the lessor, and less significant where investment tax credits are not assumed in lessor pricing.

"Even with this increase, implicit rental rates will remain less costly

A GLOSSARY OF LEASING TERMS

Accelerated Cost Recovery

The depreciation schedule of the Economic Recovery Tax Act of 1981 (ERTA), modified by the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA), that allows faster write offs of plant and equipment capital costs.

Bargain Purchase Option

A lease provision allowing the lessee, at its option, to purchase the equipment for a price predetermined at lease inception that is substantially lower than the expected fair market value at the date the option can be exercised.

Bargain Renewal Option

A lease provision allowing the lessee, at its option, to renew the equipment lease for a rental rate predetermined at lease inception that is substantially lower than the expected fair market value at the date the option can be exercised.

Capital Lease

Type of lease classified and accounted for by a lessee as a purchase and by the lessor as a sale or financing, if it meets any one of the several criteria.

Closed End Lease

A true lease in which the lessor assumes the depreciation risk. The lessee bears no obligation at the end of the lease. This term is used to distinguish the lease from an open end lease.

Conditional Sale

Also known as a security agreement. An agreement with an option to purchase the leased property at the expiration of the lease at a bargain purchase price.

Effective Lease Rate

The effective lease rate (for the lessee) of the cash flows resulting from a lease transaction.

Fair Market Purchase Option

An option to purchase leased prop-

erty at the end of the lease term at its then fair market value.

FASB 13

Statement issued by the Financial Accounting Standards Board establishing financial accounting standards for lessees and lessors.

Full Payment Lease

A lease in which the cash flows will return to the lessor the acquisition cost of the asset, financing, overhead with an acceptable ROI.

Guideline Lease

A lease written under criteria or "guidelines" established by the IRS to determine the availability of tax benefits to the lessor.

Leveraged Lease

In this type of lease, the lessor provides an equity portion (usually 20 pct to 40 pct) of the equipment cost and lenders provide the balance on a nonrecourse debt basis.

Master Lease

A contract where the lessee leases currently needed assets and is able to acquire other assets under the same basic terms and conditions without negotiating a new contract.

Net Lease

A lease where lease payments paid to the lessor do not include insurance and maintenance, which are paid separately by the lessee.

Nonpayout Lease

A lease in which the cash flows will not be sufficient to cover the full costs of the equipment, financing, and administration and provide a satisfactory return.

Operating Lease

An operating lease is any lease which is not a capital lease.

Present Value

The current equivalent value of payments or a stream of payments to be received at various times in the future.

Safe Harbor Lease

The temporary type of tax-oriented lease established by Congress in the Economic Recovery Tax Act of 1981 (ERTA) and subsequently amended by the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA).

Tax Benefit Transfer (TBT)

A specific type of lease transaction under safe harbor that allows an owner to sell equipment and the associated tax benefits for an amount equal to 10 to 25% of the equipment's cost to a nominal lessor who leases the equipment back to the former owner.

Tax Lease

A lease where the lessor recognizes the tax benefits of ownership resulting from depreciation and/or investment tax credit; generally, the lease rate factor on tax leases is reduced to reflect the lessor's recognition of these tax benefits.

True Lease (for Tax Purposes)

A "true lease" is a term for defining types of transactions which qualify as leases under the Internal Revenue Code so the lessor can claim tax benefits of ownership such as depreciation and ITC, and the lessee can claim rental payments as tax deductions.

Vendor Lease

A lease wherein an equipment manufacturer or distributor has its own leasing company or an agreement with a leasing company to offer lease financing as a sales aid.

Wrap Lease

A lease in which a lessor sells the leased equipment to a third party (an equity investor) who then leases the equipment back to the lessor for a longer term than the user lease.

Source: American Association of Equipment Lessors

than comparable loan costs. Other key advantages will remain intact such as 100 pct financing, fixed-rate, term-related to asset life and transfer of residual risk to lessor.

"As a byproduct of the higher rates, it will be more difficult to achieve 'operating lease' off balance sheet treatment under FASB 13," he added.

"If enacted, we believe that Treasury II will have a somewhat dampening influence on middle market leasing volumes. However, this will be more due to general reductions in the level of capital expenditures than to any specific impact of the proposed changes on leasing per se.

"Big ticket leverage leases may be more seriously affected due to their greater tax sensitivity and reliance on debt to achieve maximum economic advantage," Mr. Hunter told *Iron Age*.

"In total, leasing will remain a viable and attractive means of financing equipment for many companies. However, because lease rates will move closer to loan rates, both lessors and lessees will have to focus even more carefully on anticipated equipment values at lease expiration in order to arrive at optimal economic decisions," Republic National's president predicted.

Lease financing has expanded to the point where it is the most important single source of funds to support business expenditures for capital equipment, said a report published by Brimmer & Co., Inc., Washington, D.C. For example, spending on business fixed investment amounted to \$348.3 billion in 1983. This total was divided into outlays for structures, at \$131.1 billion, and producers' durable equipment, at \$217.2 billion. In the same year, equipment leasing is estimated at \$61.2 billion. At this level, lease financing was equal to 17.6 pct of total business fixed investment. It also represented 28.2 pct of outlays for producers' durable equipment.

Leasing Meets Business' Needs

During the last few years, leasing has risen faster than total capital expenditures. Lease financing as a proportion of the latter climbed

from 14.1 pct in 1980, to 16.5 pct in '82, and to 17.6 pct in '83.

These estimates suggest that leasing is a more important source of funds to meet business capital requirements than either new equity issues, corporate bonds, commercial bank loans, or commercial mortgages. Leasing is consistently higher than is business borrowing through corporate bond issues or commercial bank loans, and it greatly exceeds funds raised through the issuance of new equities, Brimmer & Co. pointed out to *Iron Age*.

Other forms of creative financing include Industrial Revenue Bonds (IRB's) and Urban Development Action Grants (UDAG's). These are Federally encouraged tax benefit options companies may use to build new plants or refurbish old plants with the two-fold goal of increasing productivity and employment. Both require cooperation, among manufacturers, municipal authorities, and lending institutions.

The IRB route has been used four times by Hill Acme, noted company treasurer Theodore S. Sosnowski, and each time with very good results. He offered the following advice to any company that is considering the IRB approach to growth for the first time.

"First talk to your lending institution. Then start with a good attorney who has written IRB business. This can be very beneficial because it keeps you from wasting time. Legal firms specialize in this.

"But, be prepared to review the documents yourself," Mr. Sosnowski warned.

Gotta Do your Homework

An IRB can be a lease or a loan and there are variations in methodology state-by-state. The essential point is to "do your homework. You'll be reviewed by some municipal body before you can move ahead with the lender.

"Establishing a fixed fee with the law firm is also a good idea," he advised. But, "do a lot of the research on your own. This can easily save \$10,000 to \$15,000 on a \$1 million or less IRB."

"Keep in mind that under the

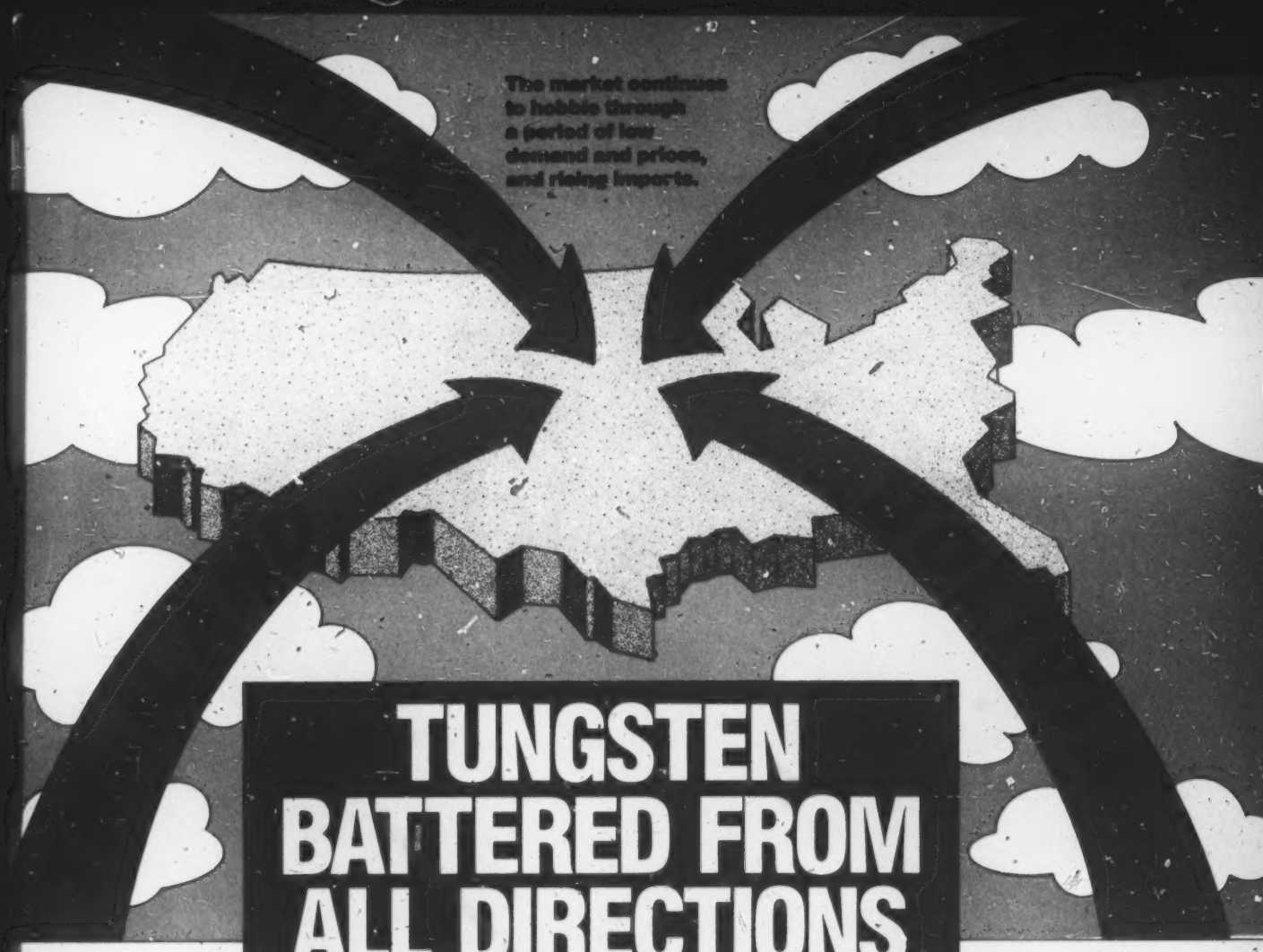
IRB rules, you cannot purchase anything until final approval is granted by the appropriate authorities."

The attraction of an IRB is, of course, a lower interest rate for the borrower and a tax advantage for the lender. "A company, particularly a small company looking to expand, should definitely consider the IRB approach. Don't be intimidated by the fact that this involves local government and a great deal of legal help. Don't be 'shy,'" advises Mr. Sosnowski. In his opinion, IRB's are an excellent route to expansion. However, he adds, "do your homework and don't leave it all up to the lawyers."

The limit on IRB's is \$10 million and is clearly designed to aid smaller companies in urban areas to increase employment. However, larger manufacturers have used the technique quite successfully.

According to Hill Acme's treasurer, his company's new fine strand brass forging rod caster would not have been built in Cleveland without an IRB.

IRB's were designed to enable municipalities to provide low-cost financing to stimulate private investment in projects that promote local economic development, Manufacturers Hanover Leasing Corp. said. While IRB's in themselves do not constitute a lease product, the two are often used in conjunction to provide full financing for plant and equipment. Many IRB's are exempt small bond issues with a \$10 million ceiling placed on the bond proceeds and capital expenditures of the project. Since many projects today need to make expenditures which exceed that limit, a leasing arrangement can be used to protect the tax exempt status of the IRB financing because a properly structured lease will not be considered a capital expenditure for purposes of the \$10 million ceiling, Manufacturers Hanover Leasing Corp. added. Clearly, financing expansion has come a long way from a check and a handshake. But, one factor remains eternal in terms of investment: The return. Cash may be obsolete; return on investment is not. □



The market continues to hobble through a period of low demand and prices, and rising imports.

TUNGSTEN BATTERED FROM ALL DIRECTIONS

The tungsten market has taken on some of the aspects of a three-legged potato race with some players running off in all directions and others running in place.

Some imports-beleaguered domestic producers have asked the Congress to lift the import duty on tungsten concentrates from Canada, China and Australia for three years.

Some domestic producers and processors, meanwhile, have asked the Administration to persuade China to cut shipments of ammonium paratungstate (APT), an upgraded tungsten product, to the U. S. market. The Refractory Metals Association wants the request reinforced with an anti-dumping complaint or legislative remedy.

Nine foreign tungsten producer/exporting countries are preparing for a September meeting in Bangkok where another attempt will be made to establish some sort of formula for a minimum price level.

The U. S. General Service Ad-

ministration, which had its tungsten stockpile sales program sheared by Congress late last year, is preparing to ask Congress for authority to sell more surplus tungsten once its current program is completed.

Meanwhile, the tungsten market overall continues to hobble through unspectacular demand levels, low prices, competitive marketing by foreign producers and, in the U. S., a dormant mining industry cramped by imports and stockpile sales.

Incentives Dwindling

With prices for wolframite (which with scheelite is a raw material for producing tungsten) down to the lowest levels in more than 10 years, incentives to mine are dwindling. Amax Inc., has closed its Climax molybdenum mine in Colorado through early September, which also means no wolframite production either, and Billiton Canada Ltd. decided on permanent shutdown of its Mt. Pleasant tungsten-molybdenum mine in New Brunswick on

July 31. Union Carbide Corp., closed its Bishop, Calif. scheelite mine last April.

Why should domestic producers want the tariff suspended on concentrates (it's currently 17¢ per lb of tungsten contained) when concentrates still make up the bulk of imports (80 pct last year) that account for the great bulk of domestic consumption? There is no altruism here, but there are some hardnosed reasons. For one thing, there is concentrates brought in from mines in which U. S. firms have an interest, The Amax Inc. 57 pct interest in Canada Tungsten Mining Corp. of Vancouver being a good example.

For another, there is the possibility that this could head off rising imports of such value-added products as APT and other compounds and powders. Some overseas suppliers, notably China and Korea, have shifted their emphasis to APT in more recent years with added impact on domestic companies both

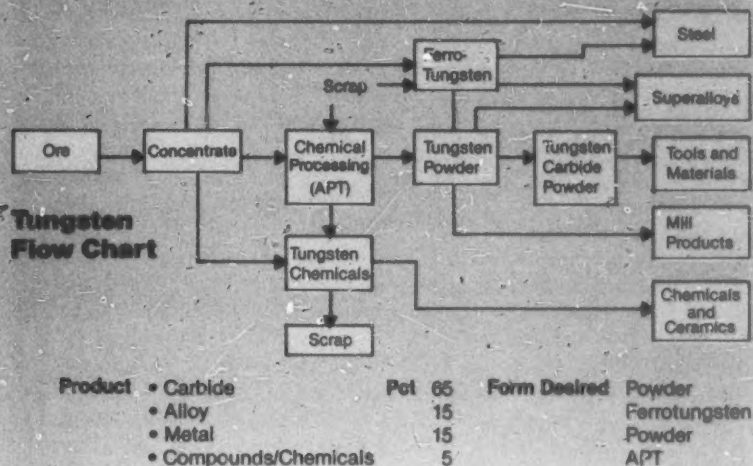
U.S. Imports of Tungsten

Thousand Lbs of Contained Tungsten in Concentrate; APT, Compounds

Year	Total	Canada	China	Bolivia	Thailand	All Others
75	7,287	1,800	310	787	829	3,961
76	5,597	1,343	377	580	588	2,709
77	7,289	2,046	466	1,581	519	2,677
78	9,853	3,030	714	2,012	858	3,039
79	11,823	3,129	1,168	2,980	1,246	3,300
80	11,901	2,914	2,048	2,794	1,046	3,099
81	12,828	2,005	3,319	2,511	708	4,287
82	10,012	2,776	2,461	1,418	295	3,062
83	8,082	1,432	665	1,459	313	4,213
84	15,986	3,227	2,298	329	1,706	8,426

Sources: Bureau of Mines, UNCTAD, industry sources

The trend in imports has included a shift toward more APT and other value-added forms. These accounted for 19.9 pct of total imports last year compared with 4.4 pct in 1980. Major suppliers in the "others" column include Peru, Portugal, Korea, Mexico and — because of a surge in 1984 — Australia. The 2,985,000 lbs of contained tungsten imported from Australia last year exceeded the total imported since 1970 by 44,000 lbs and 97 pct of the 1984 total was in concentrates.



price wise and in terms of concentrates processing. Nearly 20 pct of U. S. imports last year were APT and other value-added items, compared with 4.4 pct in 1980. If the duty suspension reverses this trend there could at least be some benefit for domestic processors.

C. Eric Ho, president of Amax Inc.'s tungsten division, said the main reasons for suspending the duty are that the U. S. is a net importer of tungsten concentrates "to the tune of 65 to 85 pct in recent years so, obviously, we need to import — and the U. S. is the only country in the Western world with a tariff on tungsten concentrates. Besides, who really pays the duty anyway? It's people who make and use tungsten products and the duty makes them less competitive."

Mr. Ho said a request to suspend the duty would have been made sooner, but not all producers/processors were agreeable. Union Carbide Corp., which recently closed

down its Bishop, Calif. tungsten mine and which has had its Emerson, Nev. mine down since 1983, has decided not to oppose the move. Union Carbide doesn't produce tungsten outside the U. S. but it does import some raw materials for processing here.

George M. Lincoln, Jr., product director-tungsten for Union Carbide's Umetco Minerals Corp. subsidiary, noted that not all exporters were paying the duty anyhow. Developing countries qualifying under the General System of Preferences, such as Bolivia, Brazil and Thailand, paid no duty while suppliers like China, Canada and Australia pay a duty. (Canada and Australia accounted for nearly 48 pct of contained tungsten imports last year, predominately concentrates, while China and Korea accounted for 19.5 pct, predominately APT).

Mr. Lincoln said the duty suspension isn't likely to have much effect on Chinese shipments of APT to the

U. S. market. He said Chinese APT is coming in at \$90 per short ton unit and that works backward to a concentrate price of about \$50. "In a normal world — if there is such a thing — if you calculate a conversion cost in the U. S., which ranges from \$30 to \$35 per short ton unit, allow for 4 pct yield loss, and apply it to the going world price (about \$70) you have an APT price range of about \$103-\$108. Or, look at it another way — the Chinese APT works backward to a concentrates price of about \$50 — what they are doing is discounting concentrates. So, it (the duty suspension) will have no effect on imports of APT from China."

Late last year, Mr. Lincoln told a Northwest Mining Association convention in Spokane that the Chinese accomplished their 1981-84 shift from concentrates to APT and oxide "in spite of a 17¢ a lb tariff on concentrates vs an APT tariff of 11.2 pct (and) the pricing implications are obvious."

The duty on APT this year was lowered to 10.8 pct and it is due to drop to 10 flat in 1987. Said Mr. Lincoln, "we can live with that, but we would fight to the death any attempt to lower or eliminate it. Our main concern is the discounting of concentrates."

When Congress last September changed the GSA's authority to sell tungsten concentrates, there was some initial confusion as to whether the restriction was an annual cap of 2.4 million lbs from 6 million lbs a year previously, or to 2.4 million lbs and no more.

"It's 2.4 million lbs — period," said Mr. Ho of Amax, who also acknowledged that Amax was among domestic companies who purchased GSA material for their own needs. He also noted that some recent GSA offerings were virtually ignored "and that should give them some indication of how weak the market really is."

Mr. Lincoln said even the whittled down GSA program should be put into perspective. While the 2.4 million lb limit is a one-time thing, it's still better than 10 pct of annual



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And if you've stopped, don't be discouraged. You can get back on treatment and bring that pressure down.

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National High Blood Pressure Education Program
National Heart, Lung, and Blood Institute—
U.S. Department of Health and Human Services

domestic concentrates consumption, he said, adding that "it isn't just a matter of market share — it's the way it is done. Back in 1983, for instance, GSA sold 1.1 million lbs, equal to 9.6 pct of total concentrate use. That's not bad, you might say, but check the timing. All of it was offered in the second half, so the impact is greater. In fact, fourth quarter awards hit 813,000 lbs, so now you're talking 28.5 pct of the available market — and that is what killed the rebound (that year)."

Queried about the early confusion over the stockpile release program, a GSA spokesman said "it's our understanding that Congress authorized the sale of 2.4 million lbs beginning with the start of the current fiscal year (Oct. 1, 1984) with no time limit. The law canceled all previous authorizations, i.e. the 6 million lbs a year, and we plan to ask Congress for authority to dispose of the excess in the stockpile."

Asked how sales were so far, he said "we sold 622,571 lbs through February—and nothing in March." The GSA spokesman said there is about 29 million lbs of surplus material left, of which about 27 million lbs "is not stockpile quality, but quite usable by industry."

GSA Cash Drawer

There could be a crimp in GSA sales of stockpile surpluses in general if Official Washington continues to tarry with the National Security Council stockpile study, which reportedly recommends limiting the stockpile to the more exotic materials. GSA's cash drawer is nearing the \$250 million cap for the current fiscal year and purchases are on hold pending definition of future stockpile goals.

While U. S. tungsten producers and consumers are wrestling with the implications of changing stockpile thinking and altered tariff schedules, busy overseas producers and exporters are preparing for another go at building a floor under a price structure.

Representatives from Australia, Brazil, Bolivia, Peru, Portugal, Thailand, Zaire, France and China

held a preliminary meeting in Bangkok in mid-March. The group didn't form a formal association, but it did agree to meet again, in the same place, to see if an accord can be reached to set an \$80-85 per short ton unit floor price.

Said Mr. Ho of Amax, "they've been trying for years to set up some sort of organization, but they haven't been successful so far."

\$100 Floor Price

Mr. Lincoln said the group's chances of establishing a viable floor price "ranges from zilch to nil. They've been trying to do it for years without success. There's too much variation in mining costs and grades of materials. Anyhow, \$80-85 is not a realistic floor level; it doesn't reflect mining, development, exploration and business costs." A realistic number, Mr. Lincoln said, would be closer to \$100.

Asked how tungsten business looks, Mr. Lincoln said "we could stay even with 1984 (which at least was better than the 82-83 slump) but there is some concern about the oil and gas market starting to drop—it's the old double-whammy: a decline in drilling rigs operating and shallower wells."

Mr. Ho said there should be some improvement in the tungsten market this year, "especially if everybody remains level-headed. You're always afraid some unprofessional player—company, country, agency—is going to tip the boat."

Mr. Lincoln rated the main problems as Chinese APT sales and U. S. stockpile release policy. "Remember, that 12.2 pct market share (taken by China) last year is the total market. Against the market (separating consumers like GE and Sylva- nia who bring in their own concentrates or APT) it's more like 23 pct."

Back in 1982, another Union Carbide tungsten official had called attention to the sharp rise in Chinese shipments of APT and other value-added forms and added, somewhat rhetorically, that "one has to question how long it will be until the Chinese are exporting cutting tools to the U. S. market." □

PRICE & PRODUCTION DATA

(Effective June 24, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	188	186	172	230
Pittsburgh	224	231	236	231
Youngstown	100	80	102	99
Lake Erie	118	141	158	127
Detroit	117	162	152	163
Chicago	455	492	482	487
Cincinnati	90	95	94	109
St. Louis	79	76	66	79
Southern	206	235	253	209
Western	94	99	98	90
U.S. Production	1,671	1,797	1,813	1,824

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50%—Pickands Mather as of 1/27/81

86.9%—U.S. Steel as of 3/15/82. Cleveland Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82

**Effective 8/1/83

NONFERROUS PRICES

(Effective June 24, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (IME)	46.70	46.91	6/24/85
Copper (IC)	66.50-68.00	66.00-68.00	6/24/85
Lead	19.00-20.00	20.00-21.00	6/3/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (IME)	253.49	252.14	6/24/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	44.00-47.00	46.00-47.00	6/11/85

ALUMINUM: Avg. for last week & previous week. COPPER (IC) in cathode. LEAD: common grade. MAGNESIUM 99.8% pig delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder	\$178.00
Cadmium, ton lots	\$1.25-1.55
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$314.65
Indium, dollars per troy oz.	\$2.50
Iridium, dollars per troy oz.	\$440.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$305.00-315.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective June 24, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,671	1,797	43,439	48,980
Capacity Utilization Rate	65.1	70.0	68.2	76.1

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	27.405
Pig Iron** (Net ton = 2000-lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$ 66.17	\$ 66.17	\$ 70.17	\$ 85.17
No. 2 bundles	\$ 47.17	\$ 47.17	\$ 49.17	\$ 56.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$ 70.50	\$ 70.50	\$ 72.50	\$ 94.50
No. 1 steel, Philadelphia	66.50	66.50	69.50	80.50
No. 1 steel, Chicago	61.50	61.50	68.50	80.50
No. 1 bundles, Detroit	59.50	59.50	64.50	82.50
Low Phos., Youngstown	57.50	57.50	57.50	89.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	79.50
No. 1 mach'y cast., Phila	91.50	91.50	91.50	98.50
No. 1 mach'y cast., Chi	99.50	99.50	108.50	117.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$101.00
Platinum, per troy oz.	\$275.00
Rhodium, per troy oz.	\$700.00
Silver ingots, per troy oz.	\$6.145
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Strait's Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

June 17—\$41.95	June 20—Holiday
June 18—\$45.52	June 21—Holiday
June 19—Holiday	

**Scrap Prices
Brass Mill Scrap**

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	61	47
Yellow brass	55 1/8	49 3/4
Red brass	57 1/8	47 1/4
Comm. bronze	59	47 1/2
Mang. bronze	48 3/4	47 3/4
Free cutting rod ends	49	50

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	56
No. 2 copper wire	47
Light copper	38

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	52
No. 2 copper wire	43
Light copper	34
No. 1 composition	46
No. 1 comp. turnings	44
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	30
Radiators	35

Aluminum		
New mixed clips	32	— 33
Old sheet	29	— 30
Old cast	29	— 30
Clean dry borings	30	— 31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	26	— 27
Mixed L.C. clips	23	— 25
Old sheets and cast	20	— 22
Borings and turnings	17	— 19
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 38
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	120	— 130
Nickel rod ends	120	— 130
Nickel sheets, clips	120	— 130
Nickel turnings	35	— 45

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

MATERIALS PRICES

EFFECTIVE JUNE 24, 1985

(Effective June 24, 1985) Prices obtained in trade based on representative tonnages per gross for delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hot melting	\$ 70.00 to	\$ 71.00
No. 2 hot melting	62.00 to	61.00
No. 1 dealer bundles	79.00 to	80.00
No. 1 factory bundles (auto)	76.00 to	77.00
No. 2 bundles	50.00 to	51.00
No. 1 busheling	77.00 to	78.00
Machine shop turnings	7.00 to	8.00
Shredding turnings	40.00 to	41.00
Cast iron borings	58.00 to	59.00
Low phos. punchings plate	84.00 to	85.00
Heavy turnings	60.00 to	61.00
No. 1 RR hot melting	78.00 to	79.00
Rails, 2 ft. and under	95.00 to	96.00
Scrap rails, random lgh	82.00 to	83.00
RR specialties	88.00 to	89.00
No. 1 machinery cast	71.00 to	72.00
Capitol cast	84.00 to	85.00
Heavy breakable cast	50.00 to	51.00
Stainless		
18-8 bundles and solids	515.00 to	525.00
18-8 turnings	515.00 to	525.00

Chicago

No. 1 hot melting	\$ 61.00 to	\$ 62.00
No. 2 hot melting	57.00 to	58.00
No. 1 dealer bundles	79.00 to	80.00
No. 1 factory bundles (auto)	77.00 to	78.00
No. 2 dealer bundles	49.00 to	50.00
No. 1 busheling	71.00 to	74.00
Shredder scrap	71.00 to	74.00
Machine shop turnings	35.00 to	36.00
Mixed borings and turnings	36.00 to	37.00
Shredding turnings	38.00 to	39.00
Cast iron borings	39.00 to	40.00
Low phos. large scrap	94.00 to	95.00
Low phos. punchings plate		
1 1/4 in. and heavier	109.00 to	110.00
Low phos. 2 ft. and under	104.00 to	105.00
No. 1 RR hot melting	84.00 to	85.00
Scrap rails random lgh	89.00 to	90.00
Revolving rails	92.00 to	93.00
Rails, 2 ft. and under	95.00 to	96.00
RR couplers and knuckles	84.00 to	85.00
RR car axles	101.00 to	102.00
No. 1 machinery cast	89.00 to	90.00
Capitol cast	87.00 to	88.00
Stove plate	87.00 to	88.00
Steel car wheels	80.00 to	81.00
Stainless		
18-8 bundles and solids	555.00 to	565.00
18-8 turnings	455.00 to	475.00
430 bundles and solids	145.00 to	150.00
430 turnings	115.00 to	120.00

Philadelphia

No. 1 hot melting	\$ 65.00 to	\$ 68.00
No. 2 hot melting	58.00 to	61.00
No. 1 dealer bundles	75.00 to	78.00
No. 2 dealer bundles	40.00 to	43.00
No. 1 busheling	73.00 to	76.00
Shredder scrap	80.00 to	83.00
Machine shop turnings	25.00 to	28.00
Mixed borings and turnings	25.00 to	28.00
Shredding turnings	37.00 to	40.00
Low phos. 5 ft. and under	74.00 to	79.00
Low phos. 2 ft. punchings	84.00 to	97.00
Electric furnace bundles	80.00 to	83.00
RR specialties	76.00 to	79.00
Rails, 2 ft. and under	96.00 to	97.00
Capitol cast	75.00 to	78.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	90.00 to	93.00

Detroit

Brokers buying prices per gross for on cars	\$ 48.00 to	\$ 49.00
No. 1 hot melting	47.00 to	48.00
No. 2 hot melting	39.00 to	40.00
No. 1 dealer bundles	59.00 to	60.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	58.00 to	59.00
Drop large flashings	38.00 to	39.00
Machine shop turnings	38.00 to	39.00
Mixed borings and turnings	16.00 to	17.00
Shredding turnings	39.00 to	40.00
Cast iron borings	23.00 to	24.00
Heavy breakable cast	33.00 to	34.00
Mixed capitol cast	48.00 to	49.00
Automobile cast	72.00 to	73.00
Stainless		
18-8 bundles and solids	520.00 to	530.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hot melting	\$ 50.00 to	\$ 53.00
No. 2 hot melting	39.00 to	42.00
No. 1 dealer bundles	66.00 to	69.00
No. 2 dealer bundles	29.00 to	32.00
Machine shop turnings	8.00 to	11.00
Shredding turnings	13.00 to	16.00
Low phos. plate	58.00 to	59.00
Electric furnace bundles	53.00 to	56.00
Galvanized bundles	86.00 to	49.00

Cleveland

No. 1 hot melting	\$ 50.00 to	\$ 53.00
No. 2 hot melting	30.00 to	33.00
No. 1 dealer bundles	66.00 to	69.00
No. 2 dealer bundles	55.00 to	58.00
No. 2 bundles	25.00 to	28.00
No. 1 busheling	49.00 to	72.00
Machine shop turnings	10.00 to	13.00
Mixed borings and turnings	8.00 to	11.00
Shredding turnings	18.00 to	21.00
Cast iron borings	15.00 to	18.00
Cast structural & plates		
2 ft. and under	92.00 to	95.00
Low phos. punchings plate	92.00 to	95.00
Drop large flashings	43.00 to	46.00
Foundry steel, 2 ft. & under	86.00 to	89.00
No. 1 RR hot melting	56.00 to	59.00
Rails, 2 ft. and under	83.00 to	86.00
Rails, 18 in. and under	87.00 to	90.00
Steel plate turnings	54.00 to	59.00
Revolving rail	87.00 to	90.00
No. 1 machinery cast	85.00 to	88.00
Capitol cast	55.00 to	58.00
Stove plate	51.00 to	54.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	325.00 to	335.00
430 bundles	80.00 to	85.00

Buffalo

Brokers buying prices per gross for on cars	\$ 50.00 to	\$ 51.00
No. 1 hot melting	40.00 to	41.00
No. 2 hot melting	42.00 to	43.00
No. 1 dealer bundles	62.00 to	63.00
No. 2 bundles	30.00 to	31.00
Machine shop turnings	15.00 to	16.00
Mixed boring and turnings	15.00 to	16.00
Shredding turnings	21.00 to	22.00
Cast iron borings	23.00 to	24.00
Low phos. plate	77.00 to	78.00
Structural and plate		
2 ft. and under	79.00 to	80.00
Rails, 2 ft. and under	79.00 to	80.00
Scrap rails, random lgh	65.00 to	66.00
No. 1 machinery cast	76.00 to	77.00
No. 1 capitol cast	58.00 to	59.00

St. Louis

No. 1 hot melting	\$ 45.00 to	\$ 46.00
No. 2 hot melting	34.00 to	35.00
Foundry steel, 2 ft.	43.00 to	44.00
No. 1 dealer bundles	45.00 to	46.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	12.00 to	13.00
Shredding turnings	16.00 to	19.00
Cast iron borings	28.00 to	29.00
No. 1 RR hot melting	48.00 to	49.00
Rails, random length	52.00 to	53.00
Rails, 18 in. and under	45.00 to	46.00
RR specialties	45.00 to	46.00
Capitol cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	86.00 to	87.00
Steel car wheels	73.00 to	74.00
Revolving rail	64.00 to	65.00
Unstripped motor blocks	58.00 to	59.00

Birmingham

No. 1 hot melting	\$ 70.00 to	\$ 71.00
No. 2 hot melting	67.00 to	68.00
No. 1 dealer bundles	71.00 to	72.00
No. 2 bundles	45.00 to	46.00
No. 1 busheling	71.00 to	72.00
Shredder scrap	84.00 to	85.00
Machine shop turnings	25.00 to	26.00
Shredding turnings	37.00 to	38.00
Cast iron borings	35.00 to	36.00
Electric furnace bundles	66.00 to	67.00
Electric furnace, 3 ft. & under	66.00 to	67.00
Structural and plate, 2 ft.	85.00 to	86.00
Structural and plate, 4 ft.	82.00 to	83.00
No. 1 RR hot melting	82.00 to	83.00
Scrap rails, random lgh	77.00 to	78.00
Rails, 2 ft. and under	91.00 to	92.00
Angles and splice bars	83.00 to	84.00
No. 1 capitol cast	82.00 to	83.00
Unstripped motor blocks	75.00 to	76.00

Cincinnati

Brokers buying prices per gross for on cars	\$ 42.00 to	\$ 43.00
No. 1 hot melting	39.00 to	40.00
No. 2 hot melting	43.00 to	44.00
No. 1 dealer bundles	23.00 to	24.00
No. 2 bundles	3.00 to	4.00
Machine shop turnings	5.00 to	6.00
Shredding turnings	12.00 to	13.00
Cast iron borings	75.00 to	76.00
Low phos. 18 in. and under	53.00 to	54.00
Rails, random length	67.00 to	68.00
Rails, 2 ft. and under	53.00 to	54.00
No. 1 capitol cast	21.00 to	22.00
Heavy breakable cast	68.00 to	69.00
Drop broken cast		

New York

Brokers buying prices per gross for on cars	\$ 44.00 to	\$ 45.00
No. 1 hot melting	35.00 to	36.00
No. 2 hot melting	20.00 to	24.00
No. 2 dealer bundles	10.00 to	11.00
Mixed borings and turnings	4.00 to	6.00
Machine shop turnings	10.00 to	12.00
Shredding turnings	35.00 to	36.00
Cast iron borings	79.00 to	80.00
Mixed yard cast	10.00 to	11.00
Heavy breakable cast	0.00 to	12.00
Stainless		
18-8 prepared solids	520.00 to	540.00
18-8 turnings	420.00 to	440.00
430 prepared solids	90.00 to	110.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross for on cars	\$ 49.00 to	\$ 51.00
No. 1 hot melting	39.00 to	41.00
No. 2 hot melting	51.00 to	53.00
No. 1 dealer bundles	32.00 to	34.00
No. 2 bundles	57.00 to	59.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	10.00 to	12.00
Shredding turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed capitol cast	42.00 to	44.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hot melting	\$ 38.00 to	\$ 40.00
No. 2 hot melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	17.00 to	19.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 capitol cast	80.00 to	82.00

Los Angeles

No. 1 hot melting	\$ 40.00 to	\$ 42.00
No. 2 hot melting	33.00 to	35.00
No. 1 dealer bundles	31.00 to	33.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	13.00 to	14.00
Shredding turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Electric furnace, 1 ft. and under	70.00 to	72.00
(Round)	72.00 to	74.00
No. 1 capitol cast		

Seattle

No. 1 hot melting	\$ 60.00 to	\$ 62.00
No. 2 hot melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 capitol cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross for on cars	\$ 71.00
No. 1 hot melting	63.00
No. 2 hot melting, cut 2 ft. and under	69.00
No. 1 dealer bundles	47.00
No. 2 bundles	45.00
Mixed steel scrap	71.00
Bulk, new fact. scrap d	60.00
Bulk, new fact. scrap f	31.00
Short steel turnings	31.00
Mixed borings and turnings	18.00
Cast scrap	87.00

Houston

Brokers buying prices per gross for on cars	\$ 67.00 to	\$ 68.00
No. 1 hot melting	54.00 to	55.00
No. 2 hot melting	40.00 to	41.00
No. 2 bundles	13.00 to	14.00
Machine shop turnings	30.00 to	31.00
Crushed turnings	76.00 to	77.00
Shredder scrap	96.00 to	97.00
Cut structural plate, 2 ft. and under	80.00 to	81.00
Cut structural plate, 5 ft. and under	60.00 to	61.00
Unstripped motor blocks	64.00 to	65.00
Capitol cast		

PRICES ON AN EVEN KEEL IN MAY

That headline, believe it or not, was the same statement that appeared on top of this page in May of last year.

That tells a lot about recent price stability in producer goods lines. Over the period from May of last year through May of this year, producer prices moved up by only 1.1 pct. That covers prices as measured by the U.S. Department of Labor's producer price index for finished goods.

Overall, producers' finished goods prices in May moved up 0.2 pct on a seasonally adjusted basis from April. This was about the same as in both March and April. The steepest monthly price increase over the past 15 months was last November's 0.3 pct rise. And in five of the months in that period there was no price movement at all.

In the past, prices of capital equipment tended to move up at a faster pace than for other industrial goods. But lately, capital equipment tags have been in line with other goods. In April and May, prices of capital equipment were unchanged.

One capital item did, however, rock the price boat a bit in May. Note on the table that tags on heavy trucks were down 4.9 pct during the month. This softness is felt to reflect buyer resistance arising from slowed economic growth. Trucks represent investments that can be quickly curtailed by companies in times of slowdown. Truck builders, in an effort to boost sales, eased off on prices in the slowed business months of April and May.

Recent price stability has been good news for buyers and users of producer goods. But for some makers and sellers of those goods, the price-restraint environment has hurt their profit margins. In such a non-inflationary period, they can't get their prices up even as many of their costs continue to rise.

Latest Month Covered: May 1985

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	396.7	+ 0.2	+ 3.6
Metal Forming Machine Tools	432.5	0	+ 2.2
Agricultural Machinery & Equip.	339.3	+ 0.1	+ 0.3
Construction Machinery & Equip.	362.4	+ 0.3	+ 1.3
Industrial Process Furnace & Ovens	384.5	+ 0.1	+ 2.7
Industrial Material Handling Equip.	294.5	+ 0.2	+ 2.4
Pumps, Compressors & Allied Equip.	355.5	0	+ 1.9
Fluid Power Equip. (Dec. 1970 = 100)	263.9	0	+ 2.6
Mechanical Power Transmission Equip.	338.1	+ 0.1	+ 4.4
Automobiles	228.1	+ 0.5	+ 3.1
Motor Trucks—Light	295.5	— 0.2	+ 4.7
Motor Trucks—Heavy	316.1	— 4.9	— 5.6
Railroad Equipment	362.6	— 0.4	+ 2.3
Fabricated Metal Structural Products	314.7	+ 0.1	+ 1.3
Electric Motors	352.0	+ 0.4	+ 3.5
Valves & Fittings (Dec. 1982 = 100)	104.6	+ 0.2	+ 2.5
Ball & Roller Bearings	347.1	0	+ 2.0
Cutting Tools & Accessories	286.0	0	+ 2.9
Heating Equipment	258.4	+ 0.2	+ 2.4
Plumbing Fixtures & Brass Fittings	312.7	+ 0.4	+ 3.7
Metal Containers	358.2	+ 0.1	+ 2.9
Miscellaneous Metal Products	301.8	— 0.1	+ 2.9

Data based on U.S. Labor Dept.'s Producer Price Index

C2150-7

August 2, 1985

CHILTON'S

IRON AGE

MANUFACTURING MANAGEMENT

A MANAGER'S GUIDE TO MATERIALS SELECTION



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**PLACE WHERE ROBOT IS KING
VERTS IN U.S. INDUSTRY
G AT ACME CLEVELAND—
AN INTERVIEW WITH B. CHARLES AMES**

IRON AGE

MANUFACTURING MANAGEMENT



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ONE OF THE ABC PUBLISHING GROUP COMPANIES

PRICE & PRODUCTION DATA

(Effective July 8, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	177	180	182	204
Pittsburgh	200	224	218	183
Youngstown	80	81	71	94
Lake Erie	122	122	158	134
Detroit	131	111	160	141
Chicago	442	467	469	450
Cincinnati	85	91	94	108
St. Louis	74	73	83	81
Southern	188	202	228	185
Western	77	90	96	85
U.S. Production	1,576	1,641	1,759	1,665

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81.

86.9¢—U.S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

**Effective 8/1/83.

NONFERROUS PRICES

(Effective July 8, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	45.27	45.58	7/ 8/85
Copper (C)	65.00-66.00	65.00-67.00	7/ 2/85
Lead	18.50-21.00	19.00-21.00	7/ 2/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	235.67	246.21	7/ 8/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	44.00-47.00	46.00-47.00	6/11/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.25-1.55
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$309.25
Indium, dollars per troy oz.	\$2.50
Iridium, dollars per troy oz.	\$410.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$315.00-320.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$93.00
Platinum, per troy oz.	\$255.00
Rhodium, per troy oz.	\$675.00
Silver ingots, per troy oz.	\$6.01
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Strait Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

July 1—\$51.86	July 4—Holiday
July 2—\$50.90	July 5—\$53.06
July 3—\$51.27	

Scrap Prices Brass Mill Scrap

(Cents per lb; over 20,000 lbs. odd 1¢ per lb)

	Solids	Turnings
Copper	60	46
Yellow brass	53 3/4	46 3/4
Red brass	56 1/2	45 1/4
Comm. bronze	57 3/4	45 1/2
Mang. bronze	45 3/4	44 3/4
Free cutting rod ends	44	43

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	53
No. 2 copper wire	44
Light copper	36

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	49
No. 2 copper wire	40
Light copper	32
No. 1 composition	45
No. 1 comp. turnings	43
Hvy. yellow brass solids	32
Hvy. yellow brass turnings	29
Radiators	34

STEEL PRODUCTION, COMPOSITE PRICES

(Effective July 8, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,576	1,641	46,656	52,453
Capability Utilization Rate	61.8	64.0	67.8	75.4

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—off. 7/1/84)	27.582	27.582	27.582	27.405
Pig iron** (Net ton= 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	\$ 68.17	\$ 67.50	\$ 66.17	\$ 82.17
No. 2 bundles	\$ 49.17	\$ 48.17	\$ 47.17	\$ 50.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$ 72.50	\$ 72.50	\$ 70.50	\$ 88.50
No. 1 steel, Philadelphia	68.50	68.50	66.50	80.50
No. 1 steel, Chicago	63.50	61.50	61.50	77.50
No. 1 bundles, Detroit	64.50	61.50	59.50	75.50
Low Phos., Youngstown	57.50	57.50	57.50	80.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	79.50
No. 1 mach'y cast., Phila	91.50	91.50	91.50	98.50
No. 1 mach'y cast., Chi	99.50	99.50	99.50	115.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Aluminum		
New mixed clips	30	— 32
Old sheet	28	— 29
Old cast	28	— 29
Clean dry borings	29	— 30

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum		
Segregated clippings	25	— 26
Mixed L.C. clips	23	— 24
Old sheets and cast	20	— 22
Borings and turnings	17	— 18
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	44	— 45
No. 2 copper wire	36	— 37
Light copper	31	— 32
Radiators	30	— 31
No. 1 composition	38	— 40
No. 1 composition turnings	35	— 37
Cocks and faucets	27	— 29
Clean heavy yellow brass	26	— 28
Brass Pipe	27	— 29
New soft brass clippings	38	— 40

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	120	— 130
Nickel rod ends	120	— 130
Nickel sheets, clips	120	— 130
Nickel turnings	35	— 45

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

MATERIALS PRICES

EFFECTIVE JULY 8, 1985

(Effective July 8, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 72.00 to	\$ 73.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	82.00 to	83.00
No. 1 factory bundles (auto)	78.00 to	79.00
No. 2 bundles	50.00 to	51.00
No. 1 busheling	80.00 to	81.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	38.00 to	39.00
Low phos. punchings plate	84.00 to	85.00
Heavy turnings	62.00 to	63.00
No. 1 RR hvy. melting	83.00 to	84.00
Rails, 2 ft. and under	96.00 to	97.00
Scrap rails, random lgh	81.00 to	82.00
RR specialties	90.00 to	91.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	64.00 to	65.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	615.00 to	625.00
18-8 turnings	515.00 to	525.00

Chicago

No. 1 hvy. melting	\$ 63.00 to	\$ 64.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	77.00 to	78.00
No. 1 factory bundles (auto)	76.00 to	77.00
No. 2 dealer bundles	51.00 to	52.00
No. 1 busheling	75.00 to	76.00
Shredder scrap	73.00 to	74.00
Machine shop turnings	35.00 to	36.00
Mixed borings and turnings	36.00 to	37.00
Shoveling turnings	38.00 to	39.00
Cast iron borings	39.00 to	40.00
Low phos. large crop	94.00 to	95.00
Low phos. punchings plate		
1/4 in. and heavier	109.00 to	110.00
Low phos. 2 ft. and under	104.00 to	105.00
No. 1 RR hvy. melting	66.00 to	67.00
Scrap rails random lgh	69.00 to	70.00
Reformer rails	95.00 to	96.00
Rails, 2 ft. and under	97.00 to	98.00
RR couplers and knuckles	86.00 to	87.00
RR car axles	104.00 to	105.00
No. 1 machinery cast	99.00 to	100.00
Cupola cast	87.00 to	88.00
Stove plate	87.00 to	88.00
Steel car wheels	84.00 to	85.00
Stainless		
18-8 bundles and solids	555.00 to	565.00
18-8 turnings	465.00 to	475.00
430 bundles and solids	145.00 to	150.00
430 turnings	115.00 to	120.00

Philadelphia

No. 1 hvy. melting	\$ 67.00 to	\$ 70.00
No. 2 hvy. melting	60.00 to	63.00
No. 1 dealer bundles	79.00 to	82.00
No. 2 dealer bundles	44.00 to	47.00
No. 1 busheling	79.00 to	82.00
Shredder scrap	82.00 to	85.00
Machine shop turnings	25.00 to	28.00
Mixed borings and turnings	25.00 to	28.00
Shoveling turnings	38.00 to	41.00
Low phos. 5 ft. and under	80.00 to	83.00
Low phos. 2 ft. punchings	94.00 to	97.00
Electric furnace bundles	82.00 to	85.00
RR specialties	79.00 to	82.00
Rails, 2 ft. and under	96.00 to	99.00
Cupola cast	75.00 to	78.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	90.00 to	93.00

Detroit

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 50.00 to	\$ 51.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	63.00 to	64.00
Drop forge flashings	40.00 to	41.00
Machine shop turnings	36.00 to	37.00
Mixed borings and turnings	16.00 to	17.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	23.00 to	24.00
Heavy breakable cast	33.00 to	34.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	72.00 to	73.00
Stainless		
18-8 bundles and solids	525.00 to	535.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	\$ 50.00 to	\$ 53.00
No. 2 hvy. melting	39.00 to	42.00
No. 1 dealer bundles	66.00 to	69.00
No. 2 dealer bundles	29.00 to	32.00
Machine shop turnings	8.00 to	11.00
Shoveling turnings	13.00 to	16.00
Low phos. plate	56.00 to	59.00
Electric furnace bundles	53.00 to	56.00
Galvanized bundles	46.00 to	49.00

Cleveland

No. 1 hvy. melting	\$ 50.00 to	\$ 53.00
No. 2 hvy. melting	30.00 to	33.00
No. 1 dealer bundles	64.00 to	67.00
No. 1 factory bundles	55.00 to	58.00
No. 2 bundles	25.00 to	28.00
No. 1 busheling	64.00 to	67.00
Machine shop turnings	10.00 to	13.00
Mixed borings and turnings	8.00 to	11.00
Shoveling turnings	18.00 to	21.00
Cast iron borings	15.00 to	18.00
Cut structural & plates, 2 ft. and under	92.00 to	95.00
Low phos. punchings plate	92.00 to	95.00
Drop forge flashings	43.00 to	46.00
Foundry steel, 2 ft. & under	66.00 to	69.00
No. 1 RR hvy. melting	56.00 to	59.00
Rails, 2 ft. and under	83.00 to	86.00
Rails, 18 in. and under	87.00 to	90.00
Steel axle turnings	56.00 to	59.00
Railroad cast	87.00 to	90.00
No. 1 machinery cast	85.00 to	88.00
Cupola cast	55.00 to	58.00
Stove plate	51.00 to	54.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	325.00 to	335.00
430 bundles	80.00 to	85.00

Buffalo

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 51.00 to	\$ 52.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 busheling	65.00 to	66.00
No. 1 dealer bundles	65.00 to	66.00
No. 2 bundles	31.00 to	32.00
Machine shop turnings	15.00 to	16.00
Mixed boring and turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	23.00 to	24.00
Low phos. plate	77.00 to	78.00
Structural and plate, 2 ft. and under	79.00 to	80.00
Rails, 2 ft. and under	79.00 to	80.00
Scrap rails, random lgh	65.00 to	66.00
No. 1 machinery cast	76.00 to	77.00
No. 1 cupola cast	58.00 to	59.00

St. Louis

No. 1 hvy. melting	\$ 45.00 to	\$ 46.00
No. 2 hvy. melting	34.00 to	35.00
Foundry steel, 2 ft.	43.00 to	44.00
No. 1 dealer bundles	45.00 to	46.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	12.00 to	13.00
Shoveling turnings	18.00 to	19.00
Cast iron borings	28.00 to	29.00
No. 1 RR hvy. melting	48.00 to	49.00
Rails, random length	52.00 to	53.00
Rails, 18 in. and under	65.00 to	66.00
RR specialties	65.00 to	66.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	86.00 to	87.00
Steel car wheels	75.00 to	76.00
Rebelling rail	64.00 to	65.00
Unstripped motor blocks	58.00 to	59.00

Birmingham

No. 1 hvy. melting	\$ 71.00 to	\$ 72.00
No. 2 hvy. melting	68.00 to	69.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	72.00 to	73.00
Shredder scrap	86.00 to	87.00
Machine shop turnings	25.00 to	26.00
Shoveling turnings	37.00 to	38.00
Cast iron borings	35.00 to	36.00
Electric furnace bundles	66.00 to	67.00
Elec. furnace, 3 ft. & under	66.00 to	67.00
Structural and plate, 2 ft.	85.00 to	86.00
Structural and plate, 4 ft.	82.00 to	83.00
No. 1 RR hvy. melting	82.00 to	83.00
Scrap rails, random lgh	77.00 to	78.00
Rails, 2 ft. and under	91.00 to	92.00
Angles and splice bars	83.00 to	84.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	75.00 to	76.00

Cincinnati

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 43.00 to	\$ 44.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 dealer bundles	48.00 to	49.00
No. 2 bundles	23.00 to	24.00
Machine shop turnings	3.00 to	4.00
Shoveling turnings	5.00 to	6.00
Cast iron borings	12.00 to	13.00
Low phos. 18 in. and under	76.00 to	77.00
Rails, random length	54.00 to	55.00
Rails, 2 ft. and under	68.00 to	69.00
No. 1 cupola cast	55.00 to	56.00
Heavy breakable cast	21.00 to	22.00
Drop broken cast	68.00 to	69.00

New York

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 44.00 to	\$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	15.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	520.00 to	540.00
18-8 turnings	420.00 to	440.00
430 prepared solids	90.00 to	110.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 49.00 to	\$ 51.00
No. 2 hvy. melting	39.00 to	41.00
No. 1 dealer bundles	51.00 to	53.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	10.00 to	12.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	42.00 to	44.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	\$ 38.00 to	\$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	17.00 to	19.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	\$ 38.00 to	\$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	13.00 to	14.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 71.00	
No. 2 hvy. melting, cut 2 ft. and under	63.00	
No. 1 dealer bundles	69.00	
No. 2 bundles	47.00	
Mixed steel scrap	45.00	
Bush. new fact. prop'd	71.00	
Bush. new fact. unprop'd	60.00	
Machine shop turnings	31.00	
Short steel turnings	31.00	
Mixed borings and turnings	18.00	
Cast scrap	87.00	

Houston

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 67.00 to	\$ 68.00
No. 2 hvy. melting	54.00 to	55.00
No. 2 bundles	40.00 to	41.00
Machine shop turnings	13.00 to	14.00
Crushed turnings	30.00 to	31.00
Shredder scrap	76.00 to	77.00
Cut structural plate, 2 ft. and under	96.00 to	97.00
Cut structural plate, 5 ft. and under	80.00 to	81.00
Unstripped motor blocks	40.00 to	41.00
Cupola cast	84.00 to	85.00

STEEL PRICES

PRODUCER KEY With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens, Inc., Coatesville, Pa.

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston

N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Nelsen Steel & Wire Co., Chicago
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., North Tonawanda, N. Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Corp., Buffalo, N. Y.

S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh

W3 Weirton Steel Corp., Weirton, W. Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh
W14 Whittar Steel Strip Div., Whittar Industries, Ltd., Detroit

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

Cities* City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (Merchant)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
Atlanta	25.41	31.70	32.62	26.67	24.65	22.82	20.60	28.62	31.12	45.15	64.78	69.58
Baltimore	25.36	29.71	34.55	31.60	29.01	28.09	23.33	31.80	46.54	50.09	60.10	66.46
Birmingham	24.01	28.33	33.23	25.96	23.11	22.93	21.90	28.91	45.25	53.00	64.34	69.71
Boston	31.38	38.03	42.90	40.70	29.58	29.30	24.56	31.30	37.35	40.76	50.37	55.65
Buffalo	28.31	34.38	39.47	34.70	27.06	25.44	20.81	29.01	36.43	38.76	46.48	53.50
Chicago	27.10	33.65	36.70	24.29	21.37	19.53	18.85	24.82	29.01	36.60	44.26	49.91
Cincinnati	28.00	33.78	36.59	25.00	22.18	19.48	18.23	26.15	30.91	37.71	44.52	49.89
Cleveland	26.86	32.99	36.30	30.83	21.37	22.85	19.62	28.04	33.76	37.75	44.76	51.24
Denver	29.83	36.07	35.08	30.85	25.05	23.80	21.04	34.08	45.40	51.10	62.29	66.67
Detroit	27.74	34.01	37.01	24.20	22.23	20.10	18.61	26.13	30.83	37.38	44.57	50.47
Houston	26.09	27.75	30.90	32.18	24.38	25.59	22.29	35.02	42.12	42.29	55.65	62.74
Kansas City	27.96	34.56	37.59	28.93	24.76	22.96	18.86	30.72	36.05	40.14	46.87	51.81
Los Angeles	25.48	29.99	34.70	28.88	25.67	31.65	27.14	34.41	46.74	50.34	58.63	67.40
Memphis	22.92	30.88	32.23	26.91	23.85	23.75	21.20	30.26	33.38	44.50	56.48	65.86
Milwaukee	27.33	33.41	36.49	25.27	22.36	20.88	18.82	24.99	30.58	37.07	43.78	49.90
New York	29.57	36.02	39.81	36.75	30.03	24.64	22.02	31.77	38.57	41.73	47.89	53.12
Philadelphia	26.45	36.46	39.76	36.91	25.62	26.43	22.26	28.78	38.81	42.37	50.90	57.27
Pittsburgh	36.49	38.17	40.78	36.90	31.70	29.75	27.74	27.20	34.96	39.45	47.04	51.06
Portland	27.28	30.23	35.46	31.35	31.00	34.05	27.09	36.70	45.72	50.95	65.50	.....
San Francisco	25.38	30.50	34.87	29.04	25.10	29.46	26.71	34.99	46.58	50.84	60.35	66.45
Seattle	28.00	28.96	35.47	27.92	20.99	27.00	26.70	35.43	47.77	54.60	65.62	68.82
Spokane	21.04	29.38	35.34	31.74	30.37	33.23	23.00	37.00	39.45	42.47	.....	55.15
St. Louis	27.41	30.60	35.00	29.45	21.71	20.99	19.18	28.93	34.60	38.39	45.11	50.75
St. Paul	27.19	32.39	34.23	32.07	21.70	31.74	18.68	28.78	34.06	37.59	44.36	50.29

Base Quantities. All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120, Galv. sheet—16 ga x 36—120; Hot-rolled strip—1/8" x 1"; Plate 1/4" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds 3/4-2-15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1-5/8" round; Cold drawn—1" round; Hot-rolled 4140—1-5/8" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

STEEL PRICES

Codes identify Producers listed on p. 103. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A.=Not available.

Billets, Blooms, Slabs

(Dollars per net ton)	
Carbon Re-rolling, Midwest	
W5	\$366.00
N4	\$366.00
West	
C6	\$346.00
Carbon Forging, East	
B3(2)	\$473.00
C10, U1	\$473.00
R3	\$453.00
Midwest	
R3, W5	\$453.00
U1	\$473.00
S1, I3	\$473.00
C10	\$473.00
K2	\$473.00
West	
C6	\$420.00
Alloy, East	
R3	\$492.00
B3	\$512.00
U1, C10	\$512.00
Midwest	
W5	\$492.00
U1, I3	\$512.00
C10	\$512.00
R3	\$492.00
S1	\$512.00
West	
C6	\$469.00

Structurals

Carbon, East	
B3	22.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3	23.90
T10	23.90
N4	23.90
South	
C16	23.90
T10	22.90
High-Strength, Low Alloy, East	
B3	22.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
South	
C16	23.90
Wide Flange, Carbon, East	
B3	22.90
U1	22.75
J3	23.90
Midwest	
U1	22.75
N4	23.90
I3	23.90
Wide Flange, High Strength-Low Alloy, East	
U1	24.30
Midwest	
U1	24.30

Strip

Hot-Rolled, Carbon, Cut II	
Edge—all widths, East	
U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1	23.75
U1, A7	23.75
I3, B3	23.75
R3	22.05
M2	22.05

South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
S10	29.60
P15	24.80
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05

High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge, All widths, (plus extras)*	
Midwest	
M2, R3	22.05
W3, J3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge	
Midwest	
S1	37.05
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	26.10
I4	25.20
Alloy, Cold-Rolled, East (plus extras)*	
E4, M8	43.35
B4	49.75
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Heavy), East	
B3	23.75
J3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5	23.75
S1, B3	23.75
I3, A7	23.75
West	
U1	24.25
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2)	28.15
J3	26.15
U1	28.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.85
J3	26.15
D1	26.15
U1, W5	28.15
S1, B3	28.15
I3, A7	28.15
West	
U1	28.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	30.30
U1	30.30
Midwest	
J3, D1, W3	28.00
R3, Y1	28.00
G2, M11	30.00
U1, W5	30.30
S1	30.30
I3	30.30
A7	30.30
West	
U1	30.80
South	
R3	28.00
Enameling, Midwest	
U1, S1	29.65
I3, A7	29.65
J3	27.65
Long-Term, Midwest	
W5, A7, U1	31.65

R3	29.35
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Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
East	
J3	per base box 26.29
U1	28.99
Midwest	
U1	28.99
J3	26.29
M11	27.54
W3	26.29
W5	28.99
West	
U1	29.49
South	
U1	28.99
Double Reduced (55 lb)**	
Midwest	
M11	21.95
J3	21.49
U1	23.38
W3	21.49
W5	23.38
West	
U1	23.88
South	
U1	23.38
Black Plate	
Single Reduced (70 lb)*	
East	
B3	24.81
Midwest	
J3, W3	24.01
I3	24.57
W5	25.55
U1	26.27
M11	26.27
West	
U1	26.27
Double Reduced (55 lb)	
East	
B3	20.49
Midwest	
W5, M11, U1	20.49
J3	18.93
W3	18.93
West	
U1	20.49
South	
U1	20.49
*75 lb—base weight extra 6¢	
**50 lb—base weight extra \$1.40	

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3, R5	25.80
J3	25.80
U1	27.05
C10	27.05
W3	27.05
Midwest	
I4	26.00
U1, I3	27.05
R3, T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
T11, S8	31.00
J3(4), I2	31.00
M8, W10	31.00
N1	24.475

R4, B4	33.25
C10	31.00
Midwest	
W10, R3	33.25
J3	31.00
B1	33.45
L2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
West	
R3	37.15
South	
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
R5, K3	27.95
R3, J3	27.95
U1	29.20
B3	29.20
C10	29.20
Midwest	
R3	27.95
I3, C10, U1	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold-Drawn, East	
L2	35.20
R3, N1	37.90
R4	37.10
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
Midwest	
R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
L2	34.85
B5, M9	38.60
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3	23.25
L4, U1	25.75
P2	23.25
J3	26.75
Midwest	
B3	23.25
I3	25.75
J3, A7	22.80
U1, I4, S1	25.75
R3	26.75
West	
U1	25.75
O2	23.00
South	
R3	25.75
U1	25.75
Alloy East	
B3	31.05
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	31.05
I4, U1	33.55
West	
O2	31.00
South	
U1	33.55

Wire

Carbon Steel Wire, East	
B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

NEW ORDERS WENT UP —FOR SOME, AT LEAST

The orders showing in May calls for a hard second look.

Orders rose—up a solid 3.2 pct from April. But... 80 pct of the May orders increase was due to an explosion in spending for defense capital goods. Orders for military aircraft, aircraft parts and shipbuilding surged 30 pct over the April level.

Defense orders tend to come in bunches, like grapes. This volatility often distorts month-to-month trend lines for orders. May was a standout in that respect.

For example, orders received by transportation equipment producers in May were reported by the government to have gone up a strong 10 pct. But take away defense orders and total transportation equipment orders were actually down 1 pct from April.

Too, the need for a hard look at May orders goes beyond the defense business distortion.

It was reported, for example, that orders for nonelectrical machinery were up 2 pct. That should have spread good news among industrial equipment makers who have been going through some hard times. However, the May gain in these orders was due entirely to big increases in orders for office and computing equipment. Most other nonelectrical machinery categories saw declines in orders.

So, it appears that there is little reason—at least as yet—to throw hats in the air over the May increase in orders. Following the rise in orders in May, total durable goods new orders were still 2.4 pct below the level at the start of the year.

Clearly, before orders show real across-the-board strength, the U.S. economy itself must show renewed strength. The promise of this is seen in the stronger second quarter GNP showing compared to the anemic opening quarter of the year.

Billions of Dollars, Seasonally adjusted
Monthly Total, unless otherwise noted
Source: U.S. Dept of Commerce

		Latest Month or Qtr.	Previous Month or Qtr.	Same Period Year Ago
CAPITAL EXPENDITURES (Annual Rates)				
U.S. Industry, Total	2nd Qtr*	\$388.9	\$380.1	\$348.3
Manufacturing, Total	2nd Qtr*	157.0	151.0	135.3
Manufacturing, Durable Goods	2nd Qtr*	76.8	74.0	63.1
Mining Industry	2nd Qtr*	16.9	16.2	16.0
KEY INDICATORS, Durable Goods Manufacturing				
New Orders	May	102.9	99.7	101.0
Shipments	May	102.8	102.3	96.9
Inventories	May	191.5	192.5	180.5
Unfilled Orders	May	344.7	344.6	344.0
NEW ORDERS, METALWORKING				
Capital Goods Producers, Nondefense Industries	May	25.6	25.4	28.6
Capital Goods Producers Defense Industries	May	8.7	6.1	6.6
Primary Metals, Total	May	10.5	11.2	10.3
Steel (SIC 331)	May	4.2	4.7	4.0
Iron & Steel Castings (SIC 332)	May	1.3	1.4	1.2
Nonferrous Metals	May	5.0	5.1	5.1
Nonelectrical Mach.-Equip. Industries, Total	May	17.2	16.9	18.4
Engines & Turbines	May	0.9	1.0	0.9
Farm Machinery & Equipment (Shipments)	May	0.9	1.0	0.9
Construction, Mining & Mat. Hdlg. Equip.	May	2.8	3.0	3.0
General Industrial Machinery	May	1.3	1.5	1.4
Fluid Power Equipment** (Index-1972 = 100)	May	298.0	296.0	304.0
Metalworking Machinery	May	0.9	0.9	1.0
Machine Tools, Total (\$Mill., Unadjusted)***	May	223.2	183.5	319.6
Machine Tools, Metalcutting***	May	170.9	122.1	188.5
Machine Tools, Metalforming***	May	52.3	61.4	131.1
Electrical Mach. & Equip. Industries, Total	May	15.1	14.4	16.9
Elec. Transmission Equip. & Ind. Apparatus	May	2.0	1.9	2.0
Household Appliances	May	1.4	1.4	1.6
Communication Equipment	May	5.5	5.2	5.6
Transportation Equipment, Total	May	26.4	24.0	24.6
Motor Vehicles & Parts (Shipments)	May	16.7	16.5	15.3
Aircraft, Missiles & Parts	May	8.0	6.4	7.5
Shipbuilding & Military Tanks	May	1.0	0.4	1.0
Fabricated Metal Products, Total	May	13.5	13.5	11.2
Instruments, Total	May	4.9	4.8	4.8

*Est. Commerce Dept. **Source: National Fluid Power Assn. ***Source: NAMA

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August 16, 1985

IRON AGE

MANUFACTURING MANAGEMENT

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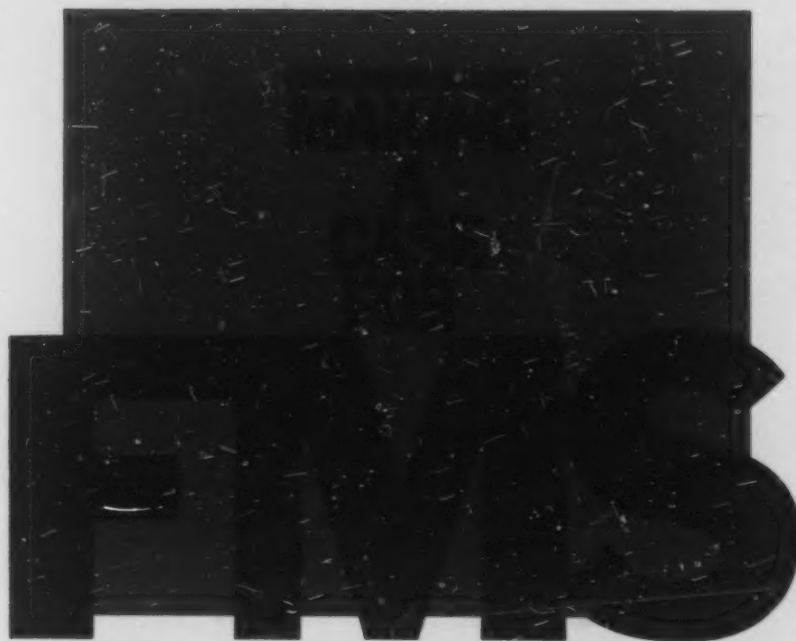
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SEVEN TRAITS MAKE THE DIFFERENCE**

**BALANCING YOUR WORK AND HOME LIFE—
A CRUEL TUG OF WAR**

CHILTON'S IRON AGE

MANUFACTURING MANAGEMENT



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MAKING A CASE FOR FMS

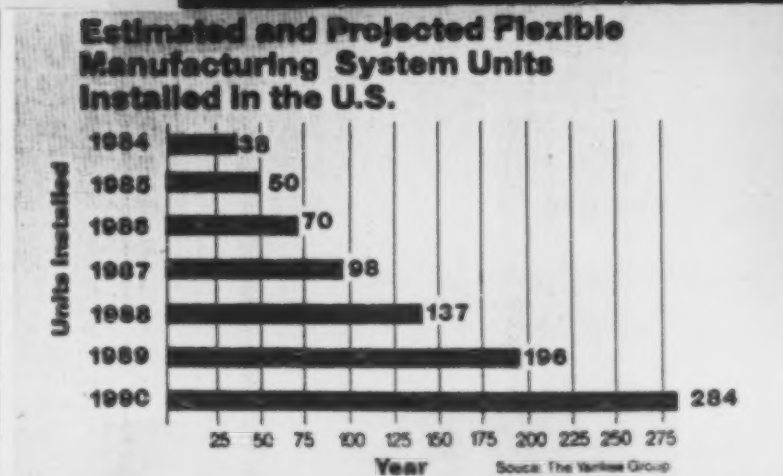
Most flexible manufacturing systems of the past were not very flexible at all, but computers and software are now changing industry's view.

BY ROBERT E. HARVEY
AND JAMES B. POND

Fads—in manufacturing circles as elsewhere—come and go. Several years ago discussing flexible manufacturing systems (FMS) was the rage, but with arrival of new buzz words like computer-integrated manufacturing (CIM) and artificial intelligence (AI), FMS fell out of fashion. Funny thing though. In the past year or two, never before have more flexible manufacturing been purchased, never has their future looked so bright.

In 1982 some 14 U.S. systems were in operation. That number, according to the Yankee Group, a Boston consulting firm, rose to 38 in 1984, will top 50 by 1985, and 300 by 1990! These systems represent the cream of world manufacturing systems. They are worth examining if only because they represent technology's leading edge. However, if flexible manufacturing is viewed as the culmination of a long journey that begins with numerically controlled machine tools, progresses through flexible machine cells (FMC) and ends in FMS; then FMS, for many firms, is the future and therefore worth a look.

A few of these state-of-the-art flexible systems are reviewed over the next few pages. Primarily be-



cause of their use of more powerful computers and more sophisticated software, they are substantially more advanced than earlier systems.

However, new FMS developments are just over the horizon. Tomorrow's systems will rely increasingly on software with artificial intelligence capabilities that will permit a high degree of adaptive control. Adaptive control will permit reaction in real time to unexpected changes in the system. Future systems, using advanced sensing technologies like machine vision, will self-correct.

In addition, FMSs will become increasingly efficient. When faced with choices as to the best way to operate, tomorrow's systems will be able to simulate all possible options, then choose the optimum path—all in real time. By way of contrast, simulation packages today can take several hours to run.

Today, an FMS is an integrated system of machine tools and material handling equipment designed to manufacture a variety of parts at low or medium volumes at relatively slow production speeds. Tomorrow's FMS will produce parts at much faster rates.

Although they have some characteristics in common, current FMSs are a diverse lot. A few systems, for example, are not very flexible and can only machine three or four different parts. Other systems, however, were designed to machine up to 500 parts. Most FMSs have at least four workstations but some have as many as 32. Some systems move parts from workstation to workstation by automated wire-guided vehicles while others use conveyors, monorails, carts on tracks and robots. And most current systems, but not all, were supplied by one vendor.

VOUGHT CORP.

In the past many FMS systems turned up to be more flexible in concept than in fact. Owners found that the systems were best employed turning out large numbers of a relatively few varieties of parts. Truly flexible manufacturing systems, such as Vought's FMS, are a very recent development.

The Vought installation currently handles 531 different parts, usually in batches of one. This super flexibility is primarily the result of advanced software.

"We saw the flexibility as the key to the long term utility of the system. But we recognized at the outset that there were some additional cost and risk associated with a system that gives you that flexibility," observed Art Roch, Director of Industrial Modernization, Vought Corp., Dallas, a subsidiary of LTV Corp. "I don't think that we have done anything mechanically that has not been done some place else. What we have done better than most, I believe, has been to implement a computer control system that does give us the ability to go to serial production."

In batch production, unlike serial production, large numbers of a particular part are produced and stored awaiting subsequent components.

At the facility, a complete set of parts for a given application can be made in sequence, greatly reducing materials inventory and storage requirements. Serialization is possible because the system takes parts in random order. So a single, one-of-a-type part can be processed without disrupting the production flow.

Serial production, it was decided, meant that multiple parts per pallet were necessary. Now, up to 16 part numbers can reside on one pallet.

"Multiple parts on a pallet is one of the key features on the system in that it permits us a more efficient load/unload operation, but more importantly it increases our spindle utilization," explained Mr. Roch. "Essentially the approach we took with was that the spindle was the most precious resource we had. So all the software and all the queuing and material handling is geared to maximize spindle utilization."

At Vought, the software—the computer control system—is the key. The firm uses the computer to schedule all of the activities within the system—everything from cutter management to actual movement of jobs and downloading of NC programs within the cell.

Software development was a joint effort between Vought and Cincinnati Milacron, the supplier of the system.

The \$10 million system, or flexible machining cell, as the company calls it, includes eight machining centers with automatic tool changers and 90-tool magazines; an automated clean station; two automated inspection stations; two 10-pallet carousels for parts pickup and delivery; and four robot carriers.

The FMS is but one of several planned by the firm. A high-speed system that handles parts within an envelop of 180 in., by 60 in., by 24 in. has a 1988 completion date.

Another FMS for the fabrication of composites also is planned.

Despite its extreme versatility, Mr. Roch calls Vought's current FMS a first generation system. The later, second generation ones will have more computer power, improved software, and faster hardware. They will have, for example, the ability to run simulations of possible courses, the intelligence to select the optimum course, and the speed to do it in real time.

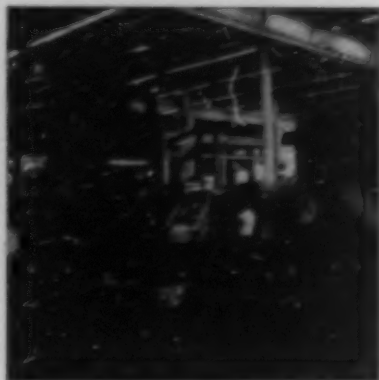
An FMS at Vought meant a great deal of change. To handle that change, management, one year before the cell was operational, named a cell manager. He began assembling the people we wanted to help him run the cell and establish the procedures he wanted to utilize.

"This manager was the first person involved from the operations side of the house," pointed out Mr. Roch. "It is very important to get operations people involved early on."



The \$10 million flexible machining cell includes eight machining centers with automatic tool changers and 90-tool magazines; an automated clean station; two automated inspection stations; two 10-pallet carousels for parts pickup and delivery; and four robot carriers.

INGERSOLL MILLING MACHINE



This \$20 million FMS, consisting of 12 machines, will replace 40 stand-alone machines and be able to process 25,000 different part types annually with 70 pct of the parts produced in lots of one.

When it rains it pours. Ingersoll Milling Machine Company, Rockford, Ill., besides being in the midst of building several FMSs for customers, including a system going to General Motors, is installing a system in its own facility. To better handle this FMS deluge, the company has formed an Integrated Manufacturing Systems (IMS) Group, strengthening and focusing Ingersoll's commitment to FMS.

The FMS that Ingersoll is building for GM's Buick-Oldsmobile-Cadillac Group is composed of seven Ingersoll/Bohle 30 hp 4-axis CNC horizontal machining centers. It is going to Grand Blanc, Mich., and will be called upon to randomly produce over 250,000 parts per year. Primarily welding jigs and checking fixtures, in lot sizes as small as one, will be produced.

Despite its spate of FMS orders, Ingersoll is keeping one system in-house. When completed, this \$20 million FMS, consisting of 12 machines, will replace 40 stand-alone machines and be able to process 25,000 different part types annually with 70 pct of the parts produced in lots of one. Six machining centers are already in place and operating. The balance of the \$20 million installation will be phased in by the end of 1986 without interrupting interim manufacturing schedules.

The goal is for the third shift to run unattended. And when this goal is reached, "there will be approximately 75 pct fewer operators than now required," commented a company spokesman. "However, this saving is incidental to the reduction in overhead costs that will be realized. Primary objectives of the installation are uninterrupted work flow, reduced inventories of work-in-process, reallocate floor space and less manufacturing support manhours."

As part of Ingersoll's light machine shop, the automated system will process workpieces the size of a 40-in. cube or less in the small lot sizes peculiar to the company's special machinery business.

When compared to other FMS, the Ingersoll system may well be the most flexible because most of products the firm produces are one of a kind. This means that the large majority of parts produced on the FMS will be made in lot sizes of one, and maybe 50 pct of these parts will never be made again.

The system employs centralized high rise parts storage and automatic guided vehicles that will transport palletized work to and from automatic pallet changers at each machine tool.

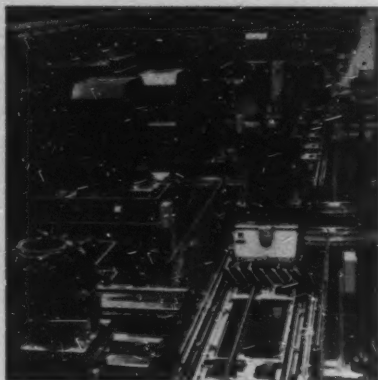
Tool management will include tool monitoring according to normal life cycles and current condition, with automated replacement of worn and broken tools. Other features include an automated parts cleaning area and inspection of finished work by coordinate measuring machines.

"All of the components of the system, the machines, the carts, the tool set-up and transportation system, and the storage system all communicate with each other. When a warning or emergency situation occurs, the system will try to correct itself, such as with tool compensation," explained George J. Hess, vice president of systems and planning. "If it is unable to, it will signal a fault condition through the monitoring system to alert the operator. The system is being designed to be as nearly automatic as possible, and the software is designed so that it is flexible and very adaptable to change."

According to Mr. Hess, an important motivation behind installation of the FMS was to improve product quality by gaining a new level of control over some the most critical processes in the manufacture of its products. The company, however, is able to exercise this high level of control because the system also will allow Ingersoll to reduce costs and increase production.

Along with its extreme flexibility, what really differentiates Ingersoll's FMS from other systems is that it is an integral part of a much larger integrated corporate business system. "The FMS is just the latest part of the computer integrated manufacturing system to be fully automated," continued Mr. Hess. "This is why we now call our overall system the computer integrated flexible manufacturing (CIFM) system."

GENERAL ELECTRIC-ERIE



The system, which was designed and built by Giddings & Lewis, Fond du Lac, Wis., has nine heavy-duty machine tools—two vertical milling machines, three horizontal machining centers, three heavy horizontal boring mills and one medium horizontal mill.

General Electric's motor frame FMS at its Locomotive Works in Erie, Pa., was the first flexible random machining system within the company. Though it captured about 100 pct of the publicity of GE's extensive modernization program at the aging Erie facility, the FMS area represents less than 1 pct of the total locomotive works.

The system, which was designed and built by Giddings & Lewis, Fond du Lac, Wis., has nine heavy-duty machine tools—two vertical milling machines, three horizontal machining centers, three heavy horizontal boring mills and one medium horizontal mill.

The machines are tied together by a 212 foot-long rail-tracked, chain-driven transporter which moves frames between 21 load/unload stations in the system.

All of these machines are equipped with GE 1050 CNC controls, while the transporter is controlled by a GE Series Six Model 6000 programmable controller, which in turn is interfaced into an executive DEC PDP 11/14 computer which directs and trends the activity of all system elements, with redundancy by a sister computer.

The computer, acting on production requirements entered by the system manager or the computerized material requirements system, displays to load/unload personnel at the fixture set-up station the sequence of parts to be loaded in order to maximize system productivity. After each frame is loaded in its fixture, and the computer signals it is ready, the computer selects the work station that can perform the first machining operations and will be available in the shortest time.

Each part continues through the system, always dispatched to the next available machine. It twice returns to the fixture set-up station to be refixedured for two other attitudes. An average of eight machining operations are required.

Over 500 cutting tools are stored within the nine machines. Each machine has either robot tool changing or storage for all the cutting tools required for the parts family, including backup tools, to keep the system operating for a full day. An automatic chip removal and coolant recirculating system is employed.

According to GE officials, it was originally planned to machine a family of six motor frames averaging 30 in. x 30 in. x 45 in., and weighing up to 2,500 lbs.

Capacity envelope of the system is 4 ft x 4 ft x 5 ft. An additional family of four motor frames and gear boxes weighing as little as 150 lbs was added later.

The motor frame is a fabrication containing both formed and cast elements. The typical frame has more than 140 machined surfaces on all six inside and six outside surfaces.

Many of these surfaces have tolerances of 0.001—0.003 in. Surface finishes are in the 125—250 microinch range.

The load station is custom-designed to assure even stock distribution. It uses hydraulically powered, self-centering arms which register on the inner surfaces of the fabrication. After the part is centered it is clamped in the fixture and transported as an integral unit.

The executive computer, acting as the brains of the FMS, directs each frame and gear box through the system. If a machine is down for repairs or maintenance, it is automatically isolated from the system and production is rescheduled using the remaining stations.

Production capacity of the flexible manufacturing system is over 5,500 frames annually.

The cost of the FMS was said to be \$16 million. The benefits of this investment include a 240 pct overall employee productivity improvement, improved part quality and consistency, a reduction in cycle time from 16 days to 16 hours, and a 38 pct increased capacity in 25 pct less space with expandability to 100 pct increased capacity within the same space.

COMAU

From the beginning, FMSs going into U.S. plants were installed by U.S. companies. Because of the specialized nature of FMSs, many thought this practice would continue indefinitely. However, there has been a rude awakening. Flexible manufacturing systems from overseas are beginning to find their way into U.S. plants.

Boeing Aircraft's Seattle plant, for example, has an FMS engineered by Shin Nippon Koki Co. Ltd., Osaka, Japan. It contains five SNK five-axis machining centers, a coordinate measurement machine, two wire-guided vehicles, an AS/RS and a VAX 11/30 computer.

Another system manufactured abroad has been installed at Borg-Warner Air Conditioning, Inc., York, Pa. The system, costing \$9.6 million, was put in by Comau S.p.A from Torino, Italy. It was Comau's second FMS in America. Earlier, a smaller FMS went to Chevrolet.

Comau was selected by Borg-Warner over better known firms because of its software expertise, its reputation as a complete system designer, its past record of performance, and its promise to assemble and test the system prior to installation at the York plant.

The Borg-Warner FMS has a buffer which can hold eight production-hours' worth of parts to be machined. In the center of the buffer, a stacker automatically circulates parts to and from the FMS. Once on the conveyor system, the part moves to a lathe or one of four horizontal machining centers. The system combines turning, milling, and boring.

"Identically tooled, each machining center has as 140-tool capacity which covers all conceivable drilling and cutting operations required," explained one official. The 20-hp, variable speed machines have adaptive control and part spindle probes.

Other special features include through-the-tool coolant and part deburring tools. All parts are washed once. A robot washes the hard-to-get interiors of parts through their machined openings. The FMS is making a highly varied range of parts for compressors. The parts range from 5 lbs to 1800 lbs.

The master computer for the system is responsible for: operations control, planning, reporting, information system interface (IBM link), machine programming, in-process inspection, material handling and tools management.

Comau, the supplier of the system, does much more than just build machine tools or machining systems. "Comau is an Italian machine tool company (with over 3,500 employees in Italy alone) that specializes in large projects, especially involving specialty machines as opposed to standard machine tools," said Dr. Guy Lombardo, president, Comau Productivity Systems Inc., Troy, Mich. "Its product line is extremely diverse. It is the broadest of any company I know. It has welding equipment, robots, and material handling systems as well as metal cutting and mechanical assembly."

The company produces standard equipment but those standards are more the exception than the rule, and even the standard equipment is designed primarily to be modules within larger systems.

Besides building FMSs, Comau is busy with other projects. "We have two major projects with GM, one of those is for cylinder heads for engines and that involves two GM plants. We are doing metal cutting and automatic assembly there," said Dr. Lombardo. "The other project, the first of its kind in the U.S., is the automated guided vehicle-based body assembly of a car. We have the turn-key responsibility for that body assembly at two General Motors facilities."

Both systems involve no direct labor and both offer limited flexibility. "Let me give our philosophy about flexibility," continued Dr. Lombardo. "Flexibility involves a certain amount of judgment, because if you make something totally flexible, it costs you an arm and a leg. And it gives you a range of flexibility you never expect to use. If you want to keep costs under control, it is important to judge the range of flexibility that is appropriate to the problem." And FMS might not always be appropriate.



The Borg-Warner FMS has a buffer which can hold eight production-hours' worth of parts to be machined. In the center of the buffer, a stacker automatically circulates parts to and from the FMS.

HUGHES AIRCRAFT CO.



The Hughes' FMS features nine 15 hp MilwaukeeMatic 600 4-axis CNC machining centers. Each of the horizontal spindle machines can store up to 68 preset tools. The FMS includes automatic palletized inspection on a Cordax measuring machine.

Precision machining on a flexible manufacturing system is gaining widespread interest with increased demands for tighter tolerances and for lighter components.

At the Electro-Optical & Data Systems Group, Hughes Aircraft Co. in El Segundo, Calif., is an FMS supplied by Kearney & Trecker Corp. that is designed to handle and machine five different fragile aluminum housings for military equipment.

The housings are manually fixtured on 24 in. sq. pallets at a station located near the toolroom.

The housings typically have 400 machined surfaces, 165 being through holes, 119 tapped holes and 40 are milled surfaces. Inspection is required on 305 of these surfaces. Tolerances are typically ± 0.002 in., while some call for ± 0.001 in.

The Hughes' flexible manufacturing system features nine Kearney & Trecker 15 hp MilwaukeeMatic 600 4-axis computer numerically controlled machining centers. Each of the horizontal spindle machines can store up to 68 preset tools. The FMS includes automatic palletized inspection on a Cordax CMM.

Material handling uses a below-the-floor towline cart system, by S.I. Handling System, to allow random processing of the workpieces. This system is controlled by a DEC II/44 central computer system that automatically delivers and removes workpieces to and from the machine tool modules and the inspection measuring machine. The inspection machine station randomly samples 20 pct of the workpieces.

Each of the machining centers is equipped with a spindle probe which is used to compensate for thermal drift.

One of the major differences of the Hughes FMS compared with comparable systems is a decision support system called Flexplan, developed by Charles Stark Draper Laboratories and Hughes Electro-Optical, that simulates and optimizes the operation of this FMS.

Henry R. Graf, Associate Manager, Fabrication, at Hughes, described the Flexplan as having six software modules that address problem areas inherent in the operation of a flexible fabrication system (FFS), as they call it. The advantage of this is that it is extremely difficult for the operator to foresee the consequences of many of the decisions that he may face without computer assistance. The results are shown graphically, which is a great time saver.

The executive software enables communication between the FFS and the computer-aided manufacturing center's HP 3000 computer. The executive software prompts the operator for data to define the problem and it then searches its data base and the Flexplan modules for information.

The end result is an indicated recommendation for the operator to follow, though the software may carry out the corrective action itself if it is possible.

According to Hughes, the predictive side of Flexplan includes a detailed simulation that mimics the major activities of the system and tracks the important measures of performance such as production and utilization. This is accomplished by a module that simulates the behavior of the FMS accurately to answer what-if questions asked by the operator. Hughes said that real time simulation will be a critical element in future computer integrated manufacturing systems.

One of the interesting aspects of the Hughes FMS is that all of the machining centers are not in full use all of the time. One or two are held in a standby condition so that normal scheduled maintenance can be carried out. In the long run, however, production apparently is more consistent with partial rather than full-time machine schedules.

On the other hand, each of the machining centers is virtually the same due to the use of CNC as part of the quality control program. The machine's spindle probe regrinds the machine automatically when the machine drifts out of tolerance due to temperature. Periodically, the probe's accuracy is tested.

YAMAZAKI MACHINERY WORKS



Most of the machine tools used at the Minokamo plant are built by Yamazaki. Many are capable of unmanned operation so that a third-shift can run either partially manned or unmanned. During the normal day and second shift, the plant needs 240 employees. At night on the third shift, only ten.

The Minokamo factory of Yamazaki Machinery Works, Ltd., near Nagoya, is the company's third modern FMS facility and therefore incorporates the lessons learned by its predecessor FMS installations.

The flexible management and manufacturing system (FMMS) features 60 computer-controlled machine tools and 28 universal and special purpose machines. These machines are linked by 32 robots plus conveyors and carting systems.

Six computer systems are needed to control the entire system and the buildings in which it is housed.

Much to the chagrin of competitors, Yamazaki geared production for 120 machine tools per month but also intended to increase that level at some future time.

According to the company, it only takes one month to produce a lathe that formerly took three months. This shortened production time considerably simplifies projecting production with market needs.

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Yamazaki uses five main machining lines. One of these is a gearbox line that is operated around-the-clock seven days a week.

A flange line has eight CNC machine tools which include a Slant Turn 40N mill center lathe that is capable of drilling, tapping and milling operations in addition to turning; VQC-20/40 vertical machining centers, HQC-30 horizontal machining centers, and seven robots.

A spindle line has seven machine tools, including grinding machines and hardening equipment.

A box machining line includes twelve horizontal machining centers. Three robots are used to load/unload workpieces. Pallet storage capacity is 228 pallets and workpieces are linked to the rest of the system by robot carts. This line can machine unmanned for up to 48 hrs.

A frame cutting line uses seven CNC machines, including a YMS H25Q machining center that is capable of machining five faces of a workpiece. This line also has an NC bed grinding machine and hardening equipment. Three robots handle the workpieces and robot carts link the line with the system.

A large-frame machining line handles the largest machine beds, which weigh up to 25 tons. An extended YMS H50Q has a 15 meter X-axis stroke.

According to reports, there are 12 varieties of frames and the total production per month initially was 240 parts. The machining cycles on some of the frame lines last for as much as 12 hrs. Cutting tools are automatically fed to the machines by a special tool drum shuttle robot.

Assembly is also automated. Finished machined components arrive at the main assembly area by robot carts and to the unit assembly area, located on a second floor, by automatic elevator robot.

The entire machine shop is on one level while the computers, services and sub-assembly areas are located on three levels located at one end of the factory. The machine shop is environmentally controlled with a closely held temperature, in keeping with the ultra-precision machining requirements set by Yamazaki.

The line pictured shows the in-line arrangement favored by many Japanese builders. The robot cart servicing the machines is carrying a circular pallet loaded with eight workpieces. The pallets are stored along the line and are transferred to an indexing pallet station where a robot arm transfers the workpiece to the machine and the finished component to the pallet. The robot cart in the aisle removes the pallet containing finished-machined parts and transports them to the sub-assembly area.

LUCAS MACHINE

Lucas Machine is among the world's machine tool builders that have incorporated an FMS as part of its own in-house production system. A \$6 million dollar price tag for the FMS was announced; justified in part by the company's estimate that the new system would cut its production costs in half.

Basically, the FMS at the Lucas plant in Cleveland consists of two machining centers, a large coordinate measuring machine, an automatic guided vehicle (AGV), and a full tool management system. The total FMS system occupies about 12,000 sq. ft. of plant space.

The two machines are a Lucas Model 20MC machining center, that uses 800 mm sq. pallets, and a Model 30MC, that uses 36 x 48 in. pallets.

The machining centers are equipped with a GE 2000MC controller, with the entire system directed by a DEC VAX 11/750 computer.

The tool management system developed by Lucas has the capability of automatically recording tool length and diameter, identification of the tools by bar code and automatic transfer to and from the machining centers. The tool management system is also capable of tracking tool life and detecting broken tools.

Tooling is preset, using a digital presetter that is capable of setting tool lengths and diameters to 0.0005 in. and also provides automatic entry of tool offset data to the system.

One of the concepts employed by Lucas is the use of mobile tool storage in addition to tool storage in the tool changer drums at the individual machines. This makes unattended operation possible without resorting to excessively large tool changer drums.

Tools weighing up to 75 lbs each can be handled. A pick-and-place robot is used to insert and remove the tools from the tool changer storage drums.

The all-important chip management needed for unmanned machining includes chip purging at the work area as well as removing chips via the wire-guided transport vehicle that is normally used to transport fixtured workpieces to and from the machining center and tools to and from the tool preset area.

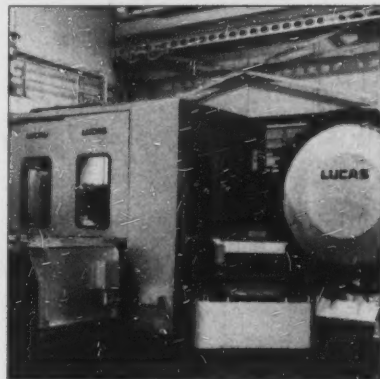
The automatic guided vehicle, which was manufactured by Litton/Automated Vehicle Systems, has a capacity of 6,000 lb. The company said that the wire guided path of this automated transport system can be easily expanded or changed, so it considers this to be the most flexible method to use for material handling.

The Lucas FMS produces prismatic parts requiring a wide variety of tools but the company points out that the real effectiveness of this system is based on the software it has developed to make the system work.

Lucas FMS software is modular and each highly structured module consists of submodules, which consist of sub-submodules, etc. The software makes use of multiple hierarchical structuring, which means that it can easily be expanded, modified or enhanced. One of the nice aspects of this system is that it is designed to be operated and supervised by shop floor rather than computer-oriented people. The design of the software allows it to operate and function without complete and expensive restructuring to meet individual user requirements, the company states. Touch screen technology allows operators to obtain detailed information by merely touching the desired item on the screen's menu. Color screen graphics simplify the scene.

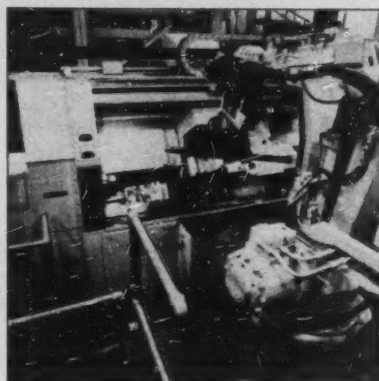
The use of animation is also helpful. Animation is used to show motion of tools and parts as handled by pallet shuttles, robots and transport vehicles. If things get confusing, Lucas has provided "Help" displays on the screen that give on-line instruction to the operator. This also minimizes the need for operator manuals, the company said.

The ability of the Lucas system to operate in an unattended mode is derived from the use of real-time simulation of system operation to provide scheduling of system resources. Thus, the company said, the system is capable of automatic rescheduling of parts processing.



The FMS at the Lucas plant in Cleveland consists of two machining centers, a large coordinate measuring machine, an automatic guided vehicle (AGV), and a full tool management system. The total FMS system occupies about 12,000 sq. ft. of plant space.

HARRIS GRAPHICS CORP.



The initial Harris SMS has nine CNC machines, with five different numerical controls; five machines that have Allen Bradley programmable controls; and four manually operated machines. Three Cincinnati Milacron T³ robots are used to load/unload machines. There are two manual stations.

Often alluded to but with too-few details publicized, the "FMS" at Harris Graphics Corp. in Fort Worth, Texas, is one of the pioneer systems in the U.S. involving turning operations. Those familiar with the system consider it a computer automated system and describe it as a structured manufacturing system (SMS) consisting of inter-related units using off-the-shelf general purpose machine tools.

Harris Graphics is the largest U.S. manufacturer of printing equipment which require a lot of rolls, shafts and cylinders. The installation was designed to produce five families of cylindrical parts having over 700 different part numbers. Some of the parts weigh 1,000 lbs.

The initial Harris SMS has nine CNC machines, with five different numerical controls; five machines that have Allen Bradley programmable controls; and four manually operated machines. Three Cincinnati Milacron T³ robots are used to load/unload machines. There are two manual stations.

The line is also unusual in that it contains two Landis cylindrical grinders with AB 7360 CNC controls and Heidenheim in-process gaging systems, and a Fortuna cylindrical grinder with an Elseta CNC and Heidenheim in-process gaging. The cylindrical grinders are tended by Milacron T³ robots.

The material handling system, which basically controls the SMS, includes wire-guided carts and is controlled by a programmable controller.

Raw material starts at in one end of the system by being cut-to-length (up to 24 in. long) on a Wagner cut-off saw under programmable control. A MTI inertial friction welding machine joins the shafts with the bearing shaft support. The assembled units go to two Pratt & Whitney Horizon Five machining centers for centering operations (one of the machines is on a slide to adjust for different lengths), and then to the robot-loaded CNC lathes, CNC grinding machines, etc.

The lathe cell consists of two Cincinnati Milacron 4-axis lathes that have opposed turrets.

One "manual cell" has a Cincinnati Milacron 3-spindle CNC Hydratel for cutting multiple keyways into rolls, shafts and cylinders; a Gilman balancer; and a straightener. In another manual cell, Harris Graphics has a gun drilling machine and a planer.

Computers used to direct this system include a DEC PDP 11/44 with 32 bits per word, with a RSX-11M operating system. The cell manager on the shop floor is a DPM 50 (DEC PDP 11/23) with a RSX-11S operating system.

The Harris Graphics system was developed under the guidance of John A. Maddox. The software approach taken is *defined* as a distributed system from the top down, but was *designed, developed and implemented* from the bottom up. It is modular to allow for future expansion. The system is interactive. The managers said that software delays and problems do occur from time to time, so they go to manual operation until the problems are solved.

Mr. Maddox, who is now a consultant, cautions that if you cannot write software, you cannot have an FMS; you must be able to do it yourself, in-house, to retain control.

"The main point to remember in any major capital installation," Mr. Maddox said, "is that the hardware is only about ten pct of the problem. The more time spent defining and understanding your requirements, both short and long term, the greater are your chances of achieving a successful installation."

Mr. Maddox noted that batch type operations usually mean lower volumes but more variety.

He pointed out that flexibility of production requirements cannot be the sole responsibility of manufacturing operations management, but must be shared by every facet and managerial discipline with a manufacturing facility. He said that design engineering does more to affect cost, quality and flexibility than manufacturing ever can.

CINCINNATI MILACRON

Cincinnati Milacron's Manufacturing Systems Division has been a pioneer proponent of flexible manufacturing systems and has done much to popularize the concept.

As a result it has introduced many innovative arrangements of FMS machine tools, tool handling and management systems, and material handling equipment.

Its own FMS installed at its Plastics Machinery Plant in Mt. Orab, located in Brown County near Cincinnati, is designed to produce parts for the 75—350 ton range of injection molding machines produced by this division. Many of the parts are typical hydraulic components.

For this installation, Milacron chose to use four Cincinnati Milacron T30 horizontal machining centers featuring dual pallet workpiece interchange, a horizontal-type coordinate measuring machine, four load/unload stations, a wash station with automatic handling unit, an automatic work changer for in-process queue of work, and an Eaton Kenway XKL Robocarrier automatic wire-guided vehicle system with three computer-controlled carts. These new machining centers can operate as stand-alone or in multi-machine cells.

A PDP 11/44 computer directs the system from a system control center that is in an area elevated above the shop floor.

The flexible manufacturing system is located in a 90 x 250 ft structure that was built between two separate existing buildings. Provision has been made for an automatic storage and retrieval system.

Part parameters of the system include a maximum 32 in. cube part envelope and weighing up to 5,000 lbs. Milacron identified over 200 parts that could fit this envelope and predicted that as many as 3,500 parts would eventually prove suitable for machining on this FMS.

The automatic workchanger shown in the foreground of the illustration holds ten pallets that contain an interesting variety of workpieces as well as variety of fixturing on the pallets. The pallets are transported to the machine tools by means of an AGV cart

Much of the versatility of the FMS is attributed to the software developed by Milacron to drive the system. Fitted with many sensing capabilities, the FMS can operate either lightly manned or unmanned in multiple shifts. Comprehensive analytical software modules are used to simulate scheduling, traffic, tool allocation, and actual production processing.

Four Milacron tool interchange stations, one per machine, are used for transferring the tools that have been delivered by the AGV carts into the chain-type tool storage matrix. At the same time, worn or no-longer needed tools are removed to be taken to the tool load/unload station.

Tool delivery chains are queued at three stations. They are sent to one of four tool interchange stations located one at each machining center.

At the far end of the room shown in the illustration is the pallet/fixture build station.

A flume-type chip/coolant collection and recovery system that was supplied by Henry Filters, Inc., Bowling Green, Ohio, is located beneath the four machining centers and the parts wash station. The installation is located outside of the main machining production area.

The FMS shown was initially scheduled for startup in the second quarter of 1985. It was hoped that this FMS would cut Milacron's workpiece queue time from days to a matter of hours. Some of the workpieces took as many as 20 days, so this can lead to a significant savings.

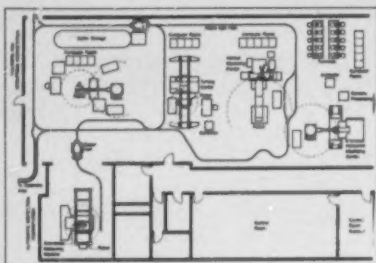
Future expansion plans are already well along, including more machines and an automatic storage and retrieval system (AS/RS). Sufficient computing power and software modules have been provided to handle these additions.

The AS/RS will provide for in-process material and part storage for the FMS and the plastics manufacturing group located in the two existing buildings and the new addition. This combination will give them the flexibility needed to respond to current and anticipated production needs.



The circular automatic workchanger shown above in the foreground holds ten pallets that contain an interesting variety of workpieces as well as fixturing techniques. The pallets are transported to the machine tools by means of an AGV cart

NAT'L BUREAU OF STANDARDS



The AMRF contains horizontal and vertical milling machines, a lathe, automated material-handling equipment, a cleaning and deburring workstation, a coordinate measurement machine and a variety of industrial robots.

The most advanced flexible manufacturing system will, most likely, never see the inside of a factory. The system, called the Automated Manufacturing Research Facility (AMRF), is under development at the Nation Bureau of Standards (NBS) Center for Manufacturing Engineering in Gaithersburg, Md.

AMRF is a proving ground for advanced manufacturing technology. As an open Federal laboratory with no commercial ambitions, the facility is accessible to firms, government agencies, and universities interested in automation research.

It incorporates a wide variety of commercially available machine tools and robots for the purpose of exploring the most practical incremental route to automation for the smaller firm.

Research at Gaithersburg covers everything from the preparation of data on a new part to final automated inspection. As to be expected from a facility run by the NBS, the development of new manufacturing standards as well as new methods of measurement and quality control for automated factories is a major aim of the research.

The program has two principle goals: to supply American industry with a new ways to make precise measurements of machined parts, and to encourage industrial modernization by providing the technical information necessary for the development of standardized interfaces between various types of equipment.

Historically, manufacturing and measurement have been separate tasks. A machinist would cut a part, then stop periodically to check its dimension with calipers and gauges.

The aim at Gaithersburg is to do both operations at the same time. If the two processes could be done simultaneously, if machining a part also meant measuring it, products would not only be produced in less time but more accurately.

Another goal is to bring automated manufacturing systems within the reach of smaller firms, firms that cannot afford to buy a ready-made FMS from a single supplier or hire the experts needed to work out the complex interfaces between otherwise incompatible equipment. Smaller firms need to be able to build up their FMS incrementally, inexpensively integrate different machines from different vendors, and switch quickly from the production of one part to another without expensive reprogramming.

Standardization—standard procedures, standard protocols, standard interfaces—will help firms develop these capabilities. And standards is the name of the game for the NBS and AMRF.

The AMRF contains horizontal and vertical milling machines, a lathe, automated material-handling equipment, a cleaning and deburring workstation, a coordinate measurement machine and a variety of industrial robots.

It also has a number of special features like modular hierarchical software. The actions of the machines in the facility are based on information in a database system which holds the design of the part being produced. A change in the database is all that is required to change the part being produced.

Another feature is the real-time system controller. It uses information fed back to it from a variety of sensors to modify its control decisions, allowing a robot or machine tool to react to variations in the environment. An advanced vision system is also featured. A robot projects bars of light across its field of view; the vision computer, then, observes how images of bars of light bend as they fall across objects and uses that information to deduce the position and shape of the objects. The vision system does not have to be taught what to see but gets descriptive information from the database. Eventually the information will be culled simply from a CAD part description.

The master program that governs the computer controller for one workstation is based on Lisp, an artificial intelligence language.

MURATA WARNER SWASEY



Onan's automated system includes two lines. One line contains a punch press while the other employs a punch press, shear and sorter. Parts from both lines are moved by wire-guided vehicle to press brake equipment.

Flexible manufacturing is not just for machining prismatic or rotational parts, although these areas have received the lion's share of attention. Increasingly, firms that produce parts made of sheet metal are turning to flexible systems.

The Wiedemann Div. of Warner & Swasey, a Cross & Trecker Company, King of Prussia, Pa., has sold some 60 flexible fabrication systems (FFS) and cells. One of the most sophisticated of these systems was delivered in 1983 to an affiliate company, Murata Warner Swasey Company, Ltd., Inuyama City, Japan. Murata, among other things, builds turning machines and CNC punch presses.

The Japanese system is significant in that it employs a variety of material handling devices that keep punching, shearing, and forming machines supplied with just-in-time deliveries.

"The material handling technology ranges from an automated storage and retrieval system to dedicated traversing tables, a sort system, and general purpose wire-guided vehicles," said Brad Peck, marketing manager, Wiedemann Div.

The automated system includes two lines. One line contains a punch press while the other employs a punch press, shear and sorter. Parts from both lines are moved by wire-guided vehicle to press brake equipment.

One reason Murata decided on the Wiedemann FFS was its parts nesting ability. Nesting permits a manufacturer to optimally lay out or nest a variety of parts on a single sheet of material. "In justifying this type of system, the first thing we are talking about is being able to randomly nest a day's production requirements; then punch and shear those requirements in a process mode rather than an individual parts mode," said Mr. Peck.

"The first economic advantage of nesting is that we optimize material utilization," continued Mr. Peck. "We reduce scrap and save on material costs. Secondly, since a variety of parts are being punched out on one large sheet, we dramatically reduce punch press time. We have a lot less material handling and a lot less tool change time because we are able to optimize tool selection."

ONAN CORP.: What is believed to be the most comprehensive sheet metal fabrication FMS in the U.S. is located at Onan Corp.'s plant in Minneapolis.

The Onan FMS is also the most complex system delivered by Trumpf America in that everything is handled automatically. The system includes an automated storage and retrieval system, automatic parts loading and unloading, a high-speed Trumatic 180 Laserpress CNC precision punching and laser cutting machine, robotic tool changer, tool storage for 300 tools in three tool towers, automatic sorting arrangement and automatic storage.

The entire FMS consists of many integrated subsystems. The storage and retrieval subsystem has a rack having 51 material bins, each capable of holding 6,600 lbs. of sheet or plate material up to 1/4 in. thick. A guided transfer cart delivers pallets of raw material that have been pre-loaded by the steel suppliers to an automatic sheet loader. A thickness device and double-thickness device ensure single-sheet transfer of the proper gage of material.

Finished parts up to 8 x 16 in. are fed into a programmable drop chute located adjacent to the laser cutting head. A linear shuttle device with six part bins sort out six part-size categories. Parts larger than 8 x 16 in. are picked up by an unloading device that has 72 suction cups that can be individually programmed to conform to desired hole patterns and sheet size.

At Onan, a Digital Equipment VAX-750 manages the system, including inventory control of tooling in the towers and material in the storage and retrieval system, incoming order information, an interface with CAD/CAM design of the piece parts.

DAIMLER-BENZ

The system installed by Hüller Hille at a Daimler-Benz plant in Germany to make a variety of exhaust manifolds is not an FMS but a flexible transfer line. The system does not use off-the-shelf equipment nor flexible spindles like those found on machining centers, the heart of most FMSs. However, the system does offer flexibility.

At Daimler-Benz, the Hüller Hille line turns out 200 varieties of manifolds, a flexibility that is achieved by moving the fixturing rather than the machine tool spindle. Flexible lines are more popular in Europe than in the U.S., especially among European auto makers, which use them to service relatively small, diverse markets.

Flexible transfer lines are composed of custom machines, machines designed to give a firm just the flexibility it needs. FMS, it is argued, often gives companies more flexibility and therefore greater costs than needed. Also, while a flexible line is built to optimally satisfy a unique set of production needs, an FMS, composed of standard tools, is no optimal solution.

Some features of the line include an overhead transfer conveyor for moving the workpieces, and five positioners which each present workpieces to clamping fixtures correctly positioned in five axes. These positioning fixtures give the line much of its flexibility.

Operations begin with the overhead transfer system placing the workpieces in the clamping fixtures of an indexing machine which aligns the manifolds. The line has three machining stations which mill the faces of the cylinder head flanges, drill the fixing holes, and counterbore inlet passages.

At the end of the line, the manifolds are transferred to another indexing machine. Here, the cylinder head flanges are deburred, the workpiece washed and inlet passages inspected.

Place Machine, Troy, Mich., represents Hüller Hille in the U.S.

CITROEN: "A return on investment is not the main factor in FMS. The objectives are to produce goods, reduce operating costs, and to make money," said Michael Parent, research director of Société Automatique Industrielle (SAI), Paris. He spoke of FMS knowingly since his firm planned and built an FMS for Citroën Mecanique (CCM) at Meudon, France.

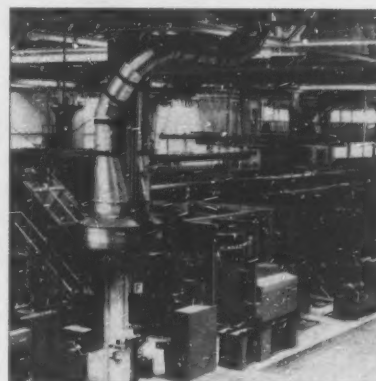
This 500 mm-cube working envelope flexible manufacturing system machines a wide range of components, from differential housings to cylinder heads, in average batch sizes of 50. Materials used include light alloys, cast irons and steels.

The FMS is capable of five-axis machining. It is organized around three five-axis Graffenstaden-built machining centers that are supplied with components and tools by five automatic guided vehicles (AGVs). The AGVs transport tools from a 600-tool capacity store, which is updated by new or redressed and set tools from a Italian-built computerized tool measuring and setting station.

Castings and fabricated parts are loaded/unloaded at six stations. AGVs then move the palletized workpieces to the machining center area. After machining, the components go to a surface treatment robot station and a washing machine. The system contains a 54-pallet store and seven automatic pallet load/unload stations.

A tri-level, hierarchical computerized control manages the FMS. At the top level is a CAD/CAM system provided by Computervision-Europe. This system generates production data and CNC programs. At the second level is a centralized control based on two minicomputers (one is a back-up unit) with peripherals and graphic display of visual FMS status.

At the third level are the distributed FMS controls. These include the three CNC machining centers, the robot, the coordinate measuring machine, the tool magazine, tool measuring and setting machine, pallet magazine control, the AGV system, and three on-floor terminals at the manual load/unload stations.



At Daimler-Benz, the Hüller Hille line turns out 200 varieties of manifolds. However, that flexibility is achieved by moving the fixturing rather than the machine tool spindle.

WHITE SUNDSTRAND

The most recent announcement of a purchase of a flexible manufacturing system apparently comes from Lockheed-Georgia Co., Marietta, Ga. The aircraft manufacturer selected the WCI Machine Tools & Systems Division of White Consolidated Industries, Cincinnati, as the contractor to install this new system. The announcement is another ripple in the flood of FMS orders from aerospace firms in recent months.

"The driver there is the Department of Defense. They have come up with the IMIP (Industrial Modernization Incentive Programs)," said an aerospace company official. "And to be a candidate for the program is the real incentive we needed to go out and purchase an FMS, because now we can get a good solid return on our investment and in past that was lacking."

Some of the aerospace firms that have recently installed or ordered FMSs include: Vought Corp., General Dynamics Corp., Boeing Co., McDonnell Douglas Corp., and Hughes Aircraft Co.

The Lockheed-Georgia system will cost between \$11 to 12 million and will be operating by December 1986. It will be able to automatically store, transport, machine, clean, and inspect a group of some 140 precision parts up to 60 in. long.

The system will employ five 5-axis machining centers, each accessing a minimum of 90 cutting tools. Additionally, the FMS will have an automatic storage and retrieval system, a 20-station pallet and part queue, three wire guided vehicles, a wash station, and a coordinate measurement machine to inspect the parts.

During the day shift, the pallet and part queue will be stocked with palletized parts. Then, on the off shifts the parts will be processed. Production lot sizes will range from one to 15 parts per order.

A VAX-11/750 computer in our distributed numerical control system will provide production work order data to the FMS computer," said Ronald G. Bergeron, FMS project manager. "These will include part numbers, lot sizes, start and finish dates, operating sequences, raw material data, fixturing data, and NC tape numbers."

LASALLE: The LaSalle Machine Tool Division of Acme-Cleveland Corp., Troy, Mich., with its installation of an advanced FMS at Vickers Inc., has served notice that it has the credentials to serve the FMS marketplace. Vickers, a subsidiary of Libby-Owens-Ford Co., has purchased the system to produce a family of iron and steel cylinder blocks for hydraulic piston pumps that serve a variety of industrial and commercial needs.

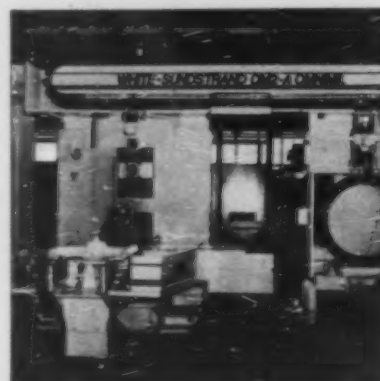
The flexible manufacturing system handles from 25 to 30 different block designs. The blocks, ranging from 2 to 60 lbs, reportedly are manufactured at rates of from 35 to 135 blocks per hour, depending on complexity of the parts.

These blocks are being machined by five CNC hole-generating machines from LaSalle, automatic turning and facing machines from Olofsson Corp, Lansing, Mich., and a single ram, dual-positioning vertical broaching machine supplied by American Broach & Machine Co., Ann Arbor, Mich.

Besides turning, facing, boring, and broaching, the system will perform heat treating, press assembly, gauging and washing.

Other equipment in the system includes 11 robots, machine vision systems, automated gauging machines, and an automatic parts conveyor systems as well as automatic parts handling and loading devices.

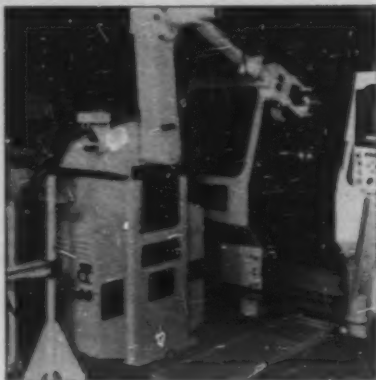
Altogether, the system contains 18 work cells and cost about \$18 million. The 18 cells will be linked by a network of parallel conveyors. One conveyor system will move parts one at a time through the turning centers while another will move the parts four at a time by pallets through the remaining machining operations.



White Sundstrand uses its OM2-A Omnimil in some of the FMS it designs.

Currently the company is engaged in a contract with Lockheed-Georgia. The system will cost between \$11 to 12 million and will be operating by December 1986.

OKUMA MACHINERY WORKS



Unlike its 1972 "Parts Center 1," which used many robot-like "hands" to transfer shafts from one operation to another, Okuma's FMS-MC-1 uses a series of machining centers located perpendicular to the material handling line. The line is designed for machining parts in small lot sizes on a 24-hr. basis.

The in-house FMS at Okuma Machinery Works' Oguchi plant in Japan is noteworthy because of the pioneer and innovative work done by the firm in automating machining operations.

Unlike its 1972 "Parts Center 1," which used many robot-like "hands" to transfer shafts from one operation to another, Okuma's FMS-MC-1 uses a series of machining centers located perpendicular to the material handling line. The line is designed for machining parts in small lot sizes on a 24-hr. basis.

Based on reports from Japan, the FMS-MC-1 consists of seven horizontal-spindle machining centers, each of which is controlled by a OSP 5000 CNC built by Okuma. The machining centers are in a row so that each machine can receive and store pallets. Unmanned trackless Robotrailers are used to supply parts to the "pallet pool" stations at the machines. Material to be machined is set on pallets in a handling area and then transferred to each machining center by the Robotrailer. After machining, the finished parts are returned to the handling area by a same Robotrailer.

A centralized tool room maintains an inventory of over 500 preset tools for the Okuma machining centers. The tools are set on pallets and are transported when needed by Robotrailer to the magazine station beside each machine.

At its introduction, nearly 100 parts could be machined on this system. The main production was spindleheads for the firm's lathes and machining centers, tailstocks for grinding machines, and saddles for lathes.

This FMS was the first of about twelve systems planned by Okuma for its factories.

EX-CELL-O CORP.: One of the more interesting new products from Ex-Cell-O Corp. is a FlexCenter horizontal spindle machining center developed jointly by its U.S. and European engineering departments.

According to Ex-Cell-O, the FlexCenter will be the core on which they intend to build flexible manufacturing cells and systems. It is modular in design so that it can be used as a stand-alone machine or as one of several machines that are linked together. The company said that FlexCenters have already been incorporated into flexible transfer lines that the company builds.

The modular design is also in keeping with the admonition of FMS experts to "begin small and keep things simple." Ex-Cell-O's FlexCenter line consists of four models. The smallest, the 220, uses 500 mm sq. pallets. The two intermediate sizes handle pallets 630 and 800 mm sq. respectively, while the largest, the 520, uses pallets that are 1,000 mm sq. These are DIN Standard sizes. The pallets have T-slots for greater flexibility in mounting fixtures and workpieces.

At the heart of the FlexCenter machines is a massive 5,000 rpm spindle that is powered by either a 30- or 40-hp AC drive. Ultra-high-speed spindles of 40,000 rpm are available.

In order to have the right tooling available for the cell's use when needed, a choice of fixed, manually interchanged or automatically interchanged tool storage conveyors is offered. Two multi-spindle head loading systems provide convenient storage and automatic insertion of 16 in. sq. heads. One of these systems is an overhead gantry for ready accessibility to the machines.

Flow-through chip management eliminates problems encountered with chips on conventional machines. A tool shank cleaning system helps eliminate chips and dirt that cause tool seating problems.

Feeds and positioning are aided by the use of a patented zero-backlash contouring table, glass scale positioning systems, 600-ipm traverse speeds, high-response AC servos and self-aligning lead screws.

Options for the FlexCenter include probing, tool sensing, thermal compensation, vision part identification, and diagnostics. The standard control is a GE 2000MC, while optional controls are either Allen-Bradley of General Numeric.

PRICE & PRODUCTION DATA

(Effective July 22, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	149	168	188	218
Pittsburgh	219	210	224	247
Youngstown	91	97	100	88
Lake Erie	119	117	118	120
Detroit	133	137	117	189
Chicago	482	495	455	466
Cincinnati	92	92	90	89
St. Louis	72	75	79	60
Southern	210	210	206	188
Western	92	94	94	79
U.S. Production	1,659	1,695	1,671	1,744

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50¢—Pitkin's Mather as of 1/27/81.

86.9¢—U.S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82, and Hanna Mining as of 2/26/82.

**Effective 8/1/83.

NONFERROUS PRICES

(Effective July 22, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	46.42	45.57	7/22/85
Copper (C)	67.00- 68.50	66.00- 68.00	7/19/85
Lead	19.00- 21.00	18.50- 21.00	7/18/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	229.88	228.47	7/22/85
Titanium Sponge	555.00- 585.00	555.00	4/29/82
Zinc	41.00- 47.00	44.00- 47.00	7/11/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.25-1.55
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$317.25
Iridium, dollars per troy oz.	\$2.50
Iridium, dollars per troy oz.	\$410.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 7.6-lb. f.o.b. N.Y.	\$310.00-323.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO con	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective July 22, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,659	1,695	50,010	55,862
Capacity Utilization Rate	65.1	66.5	67.7	74.8

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base*	27.582	27.582	27.582	27.582
(¢/lb.—eff. 7/1/84)				
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$ 69.17	\$ 68.83	\$ 66.17	\$ 82.17
No. 2 bundles	\$ 51.17	\$ 50.50	\$ 47.17	\$ 50.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$ 72.50	\$ 72.50	\$ 70.50	\$ 88.50
No. 1 steel, Philadelphia	71.50	70.50	66.50	80.50
No. 1 steel, Chicago	63.50	63.50	61.50	77.50
No. 1 bundles, Detroit	64.50	64.50	59.50	75.50
Low Phos., Youngstown	57.50	57.50	57.50	80.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	75.50
No. 1 mach'y cast., Phila	91.50	91.50	91.50	98.50
No. 1 mach'y cast., Chi	99.50	99.50	99.50	115.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$96.00
Platinum, per troy oz.	\$276.00
Rhodium, per troy oz.	\$675.00
Silver ingots, per troy oz.	\$6.08
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

July 15—\$64.17	July 18—\$64.76
July 16—\$64.17	July 19—\$68.22
July 17—\$68.11	

Scrap Prices

Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	60	47
Yellow brass	53 3/4	46 3/4
Red brass	56 1/2	45 1/4
Comm. bronze	57 1/4	45 1/2
Mang. bronze	45 3/4	44 3/4
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	56
No. 2 copper wire	48
Light copper	40

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	52
No. 2 copper wire	44
Light copper	36
No. 1 composition	46
No. 1 comp. turnings	44
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	30
Radiators	35

Aluminum		
New mixed clips	30	— 32
Old sheet	28	— 29
Old cast	28	— 29
Clean dry borings	29	— 30

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	25	— 26
Mixed L.C. clips	23	— 24
Old sheets and cast	20	— 22
Borings and turnings	17	— 18
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 38
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	38	— 40
No. 1 composition turnings	35	— 37
Cocks and faucets	27	— 29
Clean heavy yellow brass	26	— 28
Brass Pipe	27	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	120	— 130
Nickel rod ends	120	— 130
Nickel sheets, clips	120	— 130
Nickel turnings	35	— 45

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

EFFECTIVE JULY 22, 1985

Effective July 22, 1985. Prices obtained in trade based on representative turnings per gross ton delivered to consumer unless otherwise stated. Prices are the property of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 72.00 to	\$ 73.00
No. 2 hvy. melting	62.00 to	63.00
No. 1 dealer bundles	62.00 to	63.00
No. 1 factory bundles (total)	78.00 to	79.00
No. 2 bundles	54.00 to	55.00
No. 1 busheling	80.00 to	81.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	38.00 to	39.00
Low phos. punchings plate	64.00 to	65.00
Heavy turnings	62.00 to	63.00
No. 1 RR hvy. melting	63.00 to	64.00
Rails, 2 ft. and under	76.00 to	77.00
Scrap rails, random lgh	61.00 to	62.00
RR specialties	90.00 to	91.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	64.00 to	65.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	415.00 to	425.00
18-8 turnings	515.00 to	525.00

Chicago

No. 1 hvy. melting	\$ 63.00 to	\$ 64.00
No. 2 hvy. melting	59.00 to	60.00
No. 1 dealer bundles	64.00 to	65.00
No. 1 factory bundles (total)	76.00 to	77.00
No. 2 dealer bundles	53.00 to	54.00
No. 1 busheling	80.00 to	81.00
Shredder scrap	77.00 to	78.00
Machine shop turnings	40.00 to	41.00
Mixed borings and turnings	41.00 to	42.00
Shoveling turnings	43.00 to	44.00
Cast iron borings	39.00 to	40.00
Low phos. large crop	94.00 to	95.00
Low phos. punchings plate		
1/4 in. and heavier	109.00 to	110.00
Low phos. 2 ft. and under	104.00 to	105.00
No. 1 RR hvy. melting	74.00 to	75.00
Scrap rails, random lgh	72.00 to	73.00
Refractor rails	95.00 to	96.00
Rails, 2 ft. and under	97.00 to	98.00
RR couplers and knuckles	86.00 to	87.00
RR car axles	104.00 to	105.00
No. 1 machinery cast	99.00 to	100.00
Cupola cast	87.00 to	88.00
Steel plate	87.00 to	88.00
Steel car wheels	84.00 to	85.00
Stainless		
18-8 bundles and solids	555.00 to	565.00
18-8 turnings	465.00 to	475.00
430 bundles and solids	145.00 to	150.00
430 turnings	115.00 to	120.00

Philadelphia

No. 1 hvy. melting	\$ 70.00 to	\$ 73.00
No. 2 hvy. melting	60.00 to	63.00
No. 1 dealer bundles	83.00 to	86.00
No. 2 dealer bundles	44.00 to	47.00
No. 1 busheling	83.00 to	86.00
Shredder scrap	83.00 to	86.00
Machine shop turnings	25.00 to	28.00
Mixed borings and turnings	25.00 to	28.00
Shoveling turnings	39.00 to	42.00
Low phos. 5 ft. and under	80.00 to	83.00
Low phos. 2 ft. punchings	97.00 to	100.00
Electric furnace bundles	82.00 to	85.00
RR specialties	80.00 to	83.00
Rails, 2 ft. and under	98.00 to	101.00
Cupola cast	76.00 to	79.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	90.00 to	93.00

Detroit

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 50.00 to	\$ 51.00
No. 2 hvy. melting	49.00 to	50.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	28.00 to	29.00
No. 1 busheling	63.00 to	64.00
Drop large flashings	40.00 to	41.00
Machine shop turnings	36.00 to	37.00
Mixed borings and turnings	16.00 to	17.00
Shoveling turnings	36.00 to	37.00
Cast iron borings	23.00 to	24.00
Heavy breakable cast	33.00 to	34.00
Mixed cupola cast	48.00 to	49.00
Automobile cast	72.00 to	73.00
Stainless		
18-8 bundles and solids	525.00 to	535.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	\$ 50.00 to	\$ 53.00
No. 2 hvy. melting	39.00 to	42.00
No. 1 dealer bundles	66.00 to	69.00
No. 2 dealer bundles	29.00 to	32.00
Machine shop turnings	6.00 to	11.00
Shoveling turnings	13.00 to	16.00
Low phos. plate	54.00 to	59.00
Electric furnace bundles	53.00 to	56.00
Galvanized bundles	46.00 to	49.00

Cleveland

No. 1 hvy. melting	\$ 50.00 to	\$ 53.00
No. 2 hvy. melting	30.00 to	33.00
No. 1 dealer bundles	64.00 to	67.00
No. 1 factory bundles	55.00 to	58.00
No. 2 bundles	25.00 to	28.00
No. 1 busheling	64.00 to	67.00
Machine shop turnings	10.00 to	13.00
Mixed borings and turnings	8.00 to	11.00
Shoveling turnings	18.00 to	21.00
Cast iron borings	15.00 to	18.00
Cut structural & plates, 2 ft. and under	92.00 to	95.00
Low phos. punchings plate	92.00 to	95.00
Drop large flashings	43.00 to	46.00
Foundry steel, 2 ft. & under	44.00 to	49.00
No. 1 RR hvy. melting	56.00 to	59.00
Rails, 2 ft. and under	83.00 to	86.00
Rails, 18 in. and under	87.00 to	90.00
Steel axle turnings	56.00 to	59.00
Railroad cast	87.00 to	90.00
No. 1 machinery cast	85.00 to	88.00
Cupola cast	53.00 to	58.00
Stove plate	51.00 to	54.00
Stainless		
18-8 bundles	375.00 to	385.00
18-8 turnings	325.00 to	335.00
430 bundles	86.00 to	85.00

Buffalo

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 51.00 to	\$ 52.00
No. 2 hvy. melting	41.00 to	42.00
No. 1 busheling	65.00 to	66.00
No. 1 dealer bundles	65.00 to	66.00
No. 2 bundles	31.00 to	32.00
Machine shop turnings	15.00 to	16.00
Mixed boring and turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	23.00 to	24.00
Low phos. plate	77.00 to	78.00
Structural and plate, 2 ft. and under	79.00 to	80.00
Rails, 2 ft. and under	79.00 to	80.00
Scrap rails, random lgh	65.00 to	66.00
No. 1 machinery cast	76.00 to	77.00
No. 1 cupola cast	58.00 to	59.00

St. Louis

No. 1 hvy. melting	\$ 45.00 to	\$ 46.00
No. 2 hvy. melting	34.00 to	35.00
Foundry steel, 2 ft.	43.00 to	44.00
No. 1 dealer bundles	45.00 to	46.00
No. 2 bundles	29.00 to	30.00
Machine shop turnings	14.00 to	15.00
Shoveling turnings	20.00 to	21.00
Cast iron borings	28.00 to	29.00
No. 1 RR hvy. melting	48.00 to	49.00
Rails, random length	52.00 to	53.00
Rails, 18 in. and under	65.00 to	66.00
RR specialties	65.00 to	66.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stove plate	86.00 to	87.00
Steel car wheels	75.00 to	76.00
Rolling rails	64.00 to	65.00
Unstripped motor blocks	58.00 to	59.00

Birmingham

No. 1 hvy. melting	\$ 71.00 to	\$ 72.00
No. 2 hvy. melting	68.00 to	69.00
No. 1 dealer bundles	72.00 to	73.00
No. 2 bundles	46.00 to	47.00
No. 1 busheling	72.00 to	73.00
Shredder scrap	86.00 to	87.00
Machine shop turnings	25.00 to	26.00
Shoveling turnings	37.00 to	38.00
Cast iron borings	35.00 to	36.00
Electric furnace bundles	66.00 to	67.00
Elec. furnace, 3 ft. & under	66.00 to	67.00
Structural and plate, 2 ft.	72.00 to	73.00
Structural and plate, 4 ft.	82.00 to	83.00
No. 1 RR hvy. melting	82.00 to	83.00
Scrap rails, random lgh	77.00 to	78.00
Rails, 2 ft. and under	91.00 to	92.00
Angles and splice bars	83.00 to	84.00
No. 1 cupola cast	82.00 to	83.00
Unstripped motor blocks	75.00 to	76.00

Cincinnati

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 43.00 to	\$ 44.00
No. 2 hvy. melting	42.00 to	43.00
No. 1 dealer bundles	48.00 to	49.00
No. 2 bundles	23.00 to	24.00
Shoveling turnings	3.00 to	4.00
Machine shop turnings	5.00 to	6.00
Cast iron borings	12.00 to	13.00
Low phos. 18 in. and under	76.00 to	77.00
Rails, random length	54.00 to	55.00
Rails, 2 ft. and under	68.00 to	69.00
No. 1 cupola cast	55.00 to	56.00
Heavy breakable cast	21.00 to	22.00
Drop broken cast	68.00 to	69.00

New York

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 44.00 to	\$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.50 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	520.00 to	540.00
18-8 turnings	420.00 to	440.00
430 prepared solids	90.00 to	110.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 49.00 to	\$ 51.00
No. 2 hvy. melting	39.00 to	41.00
No. 1 dealer bundles	51.00 to	53.00
No. 2 bundles	32.00 to	34.00
No. 1 busheling	57.00 to	59.00
Shredder scrap	59.00 to	61.00
Machine shop turnings	10.00 to	12.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	42.00 to	48.00
Heavy breakable cast	8.00 to	10.00

San Francisco

No. 1 hvy. melting	\$ 38.00 to	\$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	17.00 to	19.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	\$ 38.00 to	\$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	13.00 to	14.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under (foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 1 dealer bundles	35.00 to	37.00
No. 2 cupola cast	89.00 to	90.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 71.00 to	\$ 72.00
No. 2 hvy. melting, cut 2 ft. and under	63.00 to	64.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	47.00 to	48.00
Mixed steel scrap	45.00 to	46.00
Bush. new fact. prep'd	71.00 to	72.00
Bush. new fact. unprep'd	60.00 to	61.00
Machine shop turnings	31.00 to	32.00
Short steel turnings	31.00 to	32.00
Mixed borings and turnings	18.00 to	19.00
Cast scrap	87.00 to	88.00

Houston

Brokers buying prices per gross ton on cars		
No. 1 hvy. melting	\$ 67.00 to	\$ 68.00
No. 2 hvy. melting	54.00 to	55.00
No. 2 bundles	40.00 to	41.00
Machine shop turnings	13.00 to	14.00
Crushed turnings	30.00 to	31.00
Shredder scrap	76.00 to	77.00
Cut structural plate, 2 ft. and under	96.00 to	97.00
Cut structural plate, 5 ft. and under	80.00 to	81.00
Unstripped motor blocks	60.00 to	61.00
Cupola cast	84.00 to	85.00

IT IS STILL ALL QUIET ON THE PRICE FRONT

Most price-watching these days is bent on detecting early signs of any breakthroughs along a long-quiet front. It has called for patience.

Some jittery watchers feel that they saw, in June, ominous signs on the price front. They acknowledged that the Labor Dept.'s Producer Price Index didn't budge at all in June. However, they pointed out that the flat-price showing was due almost entirely to price declines for energy goods and foods. Energy, especially, showed price softness. The energy goods price index declined by 2.0 pct from May.

So, say these price watchers, the zero price change officially noted for finished goods prices in June, is deceptive. They jump on one statement made by the Labor Dept.: "Finished goods others than foods and energy climbed at a 4.1 pct annual rate in June, considerably more than in comparable recent periods."

However, more cool-headed price watchers pointed out that energy prices fell in June as an expected reaction to sharp increases in both April and May. They see a 'leveling out' process at work in the June energy price rise.

Too much can be read into month-by-month data. A longer-term look at prices, right through June, shows that prices have had some roll to them, but that's all.

During the first six months of this year, the Finished Goods Price Index increased at a seasonally adjusted annual rate of 1.4 pct. That compares to rise rates of 0.6 pct in the second half of 1984 and 2.8 pct in the six months before that.

The metalworking price trend table here shows no surprises for June. The sharp price rise for heavy trucks was expected. Demand for these trucks has run high and, at the same time, tags on trucks had not been adjusted in a long time.

Latest Month Covered: June 1985

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year Ago Month
Metal Cutting Machine Tools	396.9	+ 0.1	+ 3.4
Metal Forming Machine Tools	433.8	+ 0.3	+ 2.4
Agricultural Machinery & Equip.	339.5	+ 0.1	+ 0.5
Construction Machinery & Equip.	362.0	— 0.1	+ 1.1
Industrial Process Furnace & Ovens	384.7	+ 0.1	+ 2.8
Industrial Material Handling Equip.	294.9	+ 0.1	+ 2.1
Pumps, Compressors & Allied Equip.	356.1	+ 0.2	+ 1.8
Fluid Power Equip. (Dec. 1970 = 100)	263.6	— 0.1	+ 1.7
Mechanical Power Transmission Equip.	339.7	+ 0.5	+ 4.9
Automobiles	229.1	+ 0.4	+ 3.8
Motor Trucks—Light	293.3	— 0.7	+ 3.8
Motor Trucks—Heavy	333.3	+ 5.4	+ 0.7
Railroad Equipment	362.6	0	+ 2.3
Fabricated Metal Structural Products	314.8	0	+ 1.2
Electric Motors	352.0	0	+ 3.5
Valves & Fittings (Dec. 1982 = 100)	104.9	+ 0.3	+ 2.8
Ball & Roller Bearings	353.7	+ 1.9	+ 4.0
Cutting Tools & Accessories	285.9	0	+ 2.8
Heating Equipment	259.6	+ 0.5	+ 2.7
Plumbing Fixtures & Brass Fittings	313.1	+ 0.1	+ 3.5
Metal Containers	358.2	0	+ 2.9
Miscellaneous Metal Products	302.5	+ 0.2	+ 2.8

Data based on U.S. Labor Dept.'s Producer Price Index

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CHILTON'S

September 6, 1985

IRON AGE

MANUFACTURING MANAGEMENT



IRON AGE'S ANNUAL FINANCIAL SCOREBOARD:

WAS YOUR COMPANY A

*Performance
Leader?*

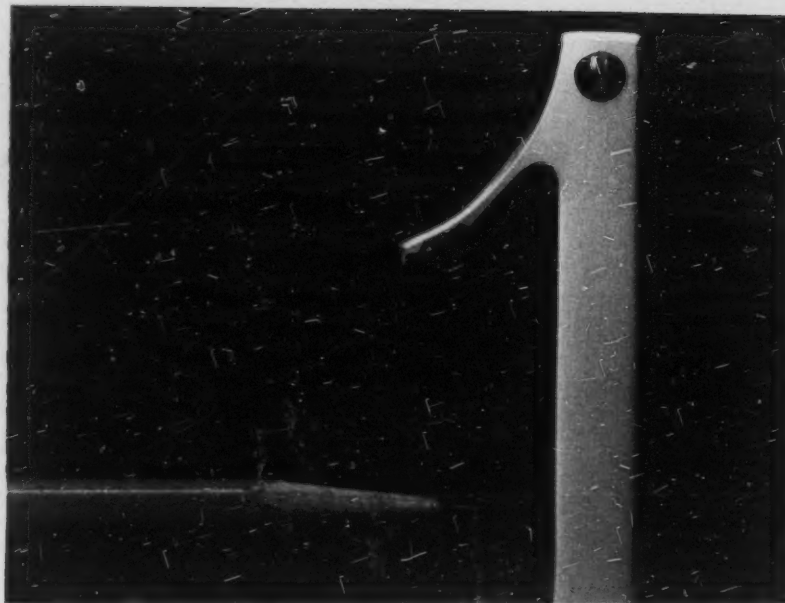
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S 2000: ENGINEERING PLASTICS—WHAT YOU
SHOULD KNOW BEFORE YOU DESIGN

FORD AND CHRYSLER UNLEASH THE ALPHA AND LIBERTY
SECOND QUARTER STEEL AND NONFERROUS EARNINGS:
STILL NO END TO THE RED INK

IRON AGE

MANUFACTURING MANAGEMENT



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ONE OF THE ABC PUBLISHING COMPANIES

TOP MANAGERS FACE A GRILLING

The questions suggest that stockholders are smarter and more world-wise.

Leasing—As a Pct of Capital Equipment Investment



Sources: U.S. Commerce Dept.

Each year, the accounting firm of Coopers & Lybrand prepares a list of questions for the management of its client companies—questions they can expect to face at their annual shareholder meetings.

The questions prepared for 1985 reflect more knowing stockholders than in years past. This year's inquiries also indicate increased concern with matters of corporate diversification and foreign competition.

The traditional questions on corporate sales and earnings have become more penetrating. For example, one multi-part question asks: How much of the change in sales and earnings was attributable to volume? Product mix? Inflation?

Corporate diversification is on the minds of shareholders. Another group of questions highlights this concern: What is the company's philosophy on expansion and/or diversification? Why was Company X acquired? What is management's expertise in the industry in which the acquired company operates?

Questions on international aspects of companies have risen. An example: Has the company considered making products through a joint venture with a foreign firm?

The foreign-oriented questions go deeper. Here are others: Has the continued strength of the dollar affected the company's ability to compete in foreign markets? Has the company considered moving facilities to foreign locations to minimize effects of the strong dollar?

There are more questions on world competition. For example: What is the company's potential in the international market? And, how does foreign competition affect marketing efforts?

Some questions about a company's overseas facilities are more pointed. Example: Why is there disparity in profit margins between do-

mestic and foreign operations?

The unspoken message of Coopers & Lybrand to corporate senior managers is for them to be on their toes. The questions suggest that stockholders are smarter and more world-wise.

And, as a corporate investor relations executive noted, stockholders want straightforward answers, "not the bland and perfunctory assurances they heard from many managers in the past."

Leasing is tops in capital investment

Leasing has become the No. 1 funding source for capital equipment investment in this country.

A recent report from the U.S. Commerce Department, entitled "A Competitive Assessment of the U.S. Equipment Leasing Industry," says leasing has accounted for an ever-larger share of capital equipment investment in recent years.

The report showed that in 1978 leasing accounted for 15.6 pct of all capital equipment. In 1983, that share had risen to 27.4 pct.

In a sum-up of the report, government analysts noted: "Equipment leasing, which totaled \$61.2 billion in 1983, has shown an 18.2 pct annual growth rate over a 5-year period, making it the largest single source of funds for capital investment, larger than corporate equities, commercial bank loans, and undistributed corporate profits."

U.S. equipment lessors are in the lead worldwide right now. But their share of the world market is under fire. The report added that U.S. lessors leased an estimated \$8 billion to \$10 billion worth of equipment to foreign lessees in 1983. But it added that their market share will diminish because of increased competition from foreign lessors, particularly European and Japanese firms.

BY JOHN BAXTER



IRON AGE'S ANNUAL FINANCIAL SCOREBOARD:

WAS YOUR COMPANY A

Performance Leader?

An analysis of the scoreboard data shows that metalworking industries made some financial gains last year. But measured over the turbulent past five years, the data shows up some corporate scars. Still, some companies seem to find ways to grow under even the worst of conditions.

BY JOHN D. BAXTER

Companies that are doing well these days can probably do well under any conditions.

That's how rough the times have been.

The economy has been on a roller-coaster at the same time industry



IRON AGE'S ANNUAL FINANCIAL SCOREBOARD

has been in the throes of massive restructuring.

The rough times are reflected here in the tables that give a financial profile of the metals producing and metalworking industries. This report, and tables, mark the second year that Iron Age has presented its Financial Scoreboard.

A study of the data will show that many companies are doing much more than just riding out a turbulent period. They have been, and are, continuing to grow, and in some cases, strongly.

The continued growth in some companies reflects successful restructuring moves, whether by mergers, acquisitions or disinvestments. In other companies, growth reflects determined efforts to do far better the things they had long been doing. In other companies, growth has come from finding and establishing leadership positions in new market niches. Most widespread, perhaps, much of the corporate growth thrust detected in the tables here is due to companies achieving new levels of cost-effectiveness in their operations.

As one successful corporate top executive has said, "Corporate growth is a very individual matter. Each company has to find its own way to grow."

Caution: Use with Care

Another point worth noting as the tables are scanned center on those companies with continuing weak financial profiles. Some of these companies, of course, are simply ones that are being battered by economic circumstances; for one reason or another, their markets are being hit harder than others. An instance might well be those companies making farm equipment.

Also, in the case of companies with weak showings on the tables, some look bad because they have long-term strategies in motion but have not yet reaped any real payoffs. This holds true for some companies in the steel industry and a number listed under Diversified Metalworking. Some of the most extensive restructuring of corporations is occurring in those industries.

It is circumstances like those that make it worthwhile to have a clear

grasp of the overall economic scene before a scan is made of the tables here. An overview can bring added meaning in an examination of the data. For sure, such an overview can help explain the many minus signs seen among the individual corporate financial measures.

The order of ranking in the Financial Scoreboard within each industry grouping is according to returns earned by companies on total invested capital over their five most recent fiscal years. This measure is used because it best offers a full and fair comparison of individual corporate performances. Too, the five-year span offers better comparisons among companies that are highly cyclical. A one-year look in such cases can give a misleading report on the real state of health of such companies.

Not the Best of Times

So, the five-year span then, in most part, covers the calendar years 1980 through 1984.

U.S. economic growth over those five years was both erratic and sluggish. The annual average growth rate for real Gross National Product over the years came to 2.1 pct, well below the U.S. long-term average of 3.5 pct. The best growth year in the span was 1984—a 6.8 pct expansion. The worst year was 1982, when the economy actually contracted by 2.1 pct. Other years in the span were up and down ones that made up an unhealthy roller-coaster ride for metalworking's many cycle-sensitive industries.

At the same time, a super-strong dollar in world currency exchanges, in effect, raised prices on exports and lowered prices on imports. That happened even as world competitors were hammering away at U.S. markets as never before—and also stealing some overseas markets of U.S. manufacturers. At the start of the five-year period, 1980, the U.S. trade deficit totaled \$36 billion; in the closing year, 1984, this deficit had swelled to an alltime record high of \$123 billion.

Worse, in the span of years noted, the U.S. trade balance in manufactured goods—a traditionally strong element in U.S. trade—went from a \$19 billion surplus in 1980 to an

alltime record deficit of \$78 billion last year.

Among the industries hit hardest by overwhelming foreign competition were many of those listed in the Financial Scoreboard. These included the steel, automotive and machine tool industries.

So, the five-year span measured in the scoreboard, 1980-84, turned out to be a Rocky Horror show for much of metalworking. Overall economic growth was sluggish and wildly cyclical. Interest rates soared through much of the period. The dollar went out of sight. And world trade competition was overwhelming.

It was in that turbulent setting that U.S. industry carried on a massive restructuring effort as it sought desperately to become more cost-effective and, in many lines, to restore itself as a world-class competitor.

A Look at the Record

With an economic framework in place, the picture of individual industry and company performances can now be inserted.

The Financial Scoreboard lists some 260 companies in 14 industry groups. As noted, ranking of companies in each group is arranged according to returns earned on invested capital over a five-year span.

The tables are divided roughly in half. On the left side is listed data for last year for companies and a comparison of those figures with 1983.

On the right side of the table are listed the financial measures covering the five latest fiscal years of companies. The key figure that determines ranking of companies appears on the right hand side.

Return on invested capital shows how much a company earned on both its stockholders' equity and its long-term debt. Thus, it measures how well corporate leaders managed the financial resources at their disposal. Further, the five-year span tends to smooth out cyclical ups and downs and non-recurring transactions that can distort data over shorter periods of time.

Where to Look

Corporate financial figures, such as those shown on the tables here,

can be very revealing, and at the same time, very confusing. In looking at the tables, some of the most useful and revealing insights can be gained if comparisons are confined chiefly to companies of similar size and product mix. That is not easy to do in view of increasing corporate diversification in U.S. industry.

Return on invested capital is one of the best measures of overall corporate management, but it still must be handled with care. In itself, it has limited meaning. In order to get a meaningful measure of the health of any company, a number of measures and ratios should be studied.

For example, the lowest five-year return on invested capital for any industry group leader on the tables is Deere & Co.'s 4.3 pct return in the Farm and Construction Machinery group. That will come as no surprise to those who have even an inkling of what has been going on in the farm machinery market. That market has long been flat-out depressed. Actually, it is remarkable that any U.S. farm machinery builder could manage to achieve a five-year investment return as high as did Deere over the time span.

It might surprise some, however, that General Motors led the auto builders with a very modest 6.8 pct return. There are two points that help explain this showing. First, the five-year period measured for this return included some lean years for auto sales as well as the more recent solid years. Also, the auto industry has lately outspent most other industries in new and renewed plants. That outgo has not yet reaped any sizeable inflow. GM has led in making big investment outlays. Earlier this year, GM announced a new \$9 billion investment plan to expand and automate plants.

In the report on last year's Financial Scoreboard, a final caution was worded that bears reaffirmation. It noted that due to the arcane ways of corporate accounting, as much is often not told in figures as is told. Some of the companies with very poor figures listed on the tables here are well-managed. They will likely show up near the head of their industry listings in the Iron Age 1990 scoreboard.



The five-year span measured in the scoreboard, 1980-84, turned out to be a Rocky Horror show for much of metalworking. Interest rates soared, the dollar went out of sight. And world trade competition was overwhelming.

PRIMARY STEEL

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal year)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Nucor Corp.	660,260	21.7	74,590	59.3	44,548	59.9	9.6	3.3	6.6	12.5	15.4	6.4
Carpenter Tech.*	528,824	33.1	62,549	+	33,441	+	4.3	15.9	8.1	11.0	12.3	6.5
Florida Steel*	286,108	21.7	12,048	+	6,662	+	4.5	45.6	35.6	4.8	6.6	1.9
Athlone Ind.	281,935	20.4	19,969	+	6,048	+	1.3	23.5	+	4.6	10.8	2.1
Cyclops	1,271,593	24.2	41,067	+	18,434	+	7.7	+	+	3.4	4.8	0.8
Copperweld Corp.*	442,154	35.8	3,449	+	4,533	+	2.2	(1.1)	(9.8)	2.3	2.5	0.1
U. S. Steel Corp.	19,104,000	9.0	1,566,000	+	493,000	+	9.1	71.8	34.6	2.3	1.7	1.2
Laclede Steel Co.	231,643	21.8	15,731	+	7,496	48.5	1.4	+	-	1.4	1.3	0.5
Lukens Steel	416,384	21.4	18,871	+	4,701	+	4.6	28.7	-	1.1	0.9	0.3
LTV Corp.*	7,046,100	53.9	(197,600)	7.1	(378,200)	-	8.8	8.0	(18.1)	(0.4)	(2.0)	(0.9)
Northwest Steel*	205,164	22.3	(47,084)	(9.7)	(34,296)	(79.0)	(11.5)	(55.1)	(56.8)	(1.8)	(2.5)	(4.2)
Wheeling-Pitts.3	1,057,151	27.2	(254)	99.3	(59,376)	(9.8)	(0.7)	6.5	7.8	(1.9)	(5.6)	(2.7)
Inland Steel*	3,324,838	13.9	119,515	+	(41,366)	64.6	(0.2)	36.4	(45.2)	(2.0)	(3.4)	(1.5)
National Intergrp.	2,294,248	(23.3)	78,282	+	13,663	+	(10.6)	+	(98.6)	(5.7)	(9.7)	(3.1)
Keystone Cons.*	208,655	(36.9)	(6,807)	11.7	(3,973)	81.3	(11.6)	-	-	(7.3)	(10.6)	(2.6)
Armco*	4,543,100	9.1	15,000	+	(295,000)	56.1	(0.2)	(29.2)	(47.7)	(8.3)	(14.8)	(4.0)
Eastmet*2	238,908	(31.3)	(9,082)	55.8	(15,966)	13.5	9.9	-	-	(11.4)	(14.6)	(2.9)
Bethlehem Steel	5,392,100	10.1	(77,800)	71.2	(112,500)	31.2	(4.4)	(22.9)	-	(12.2)	(25.8)	(5.7)
Kaiser Steel*	151,281	10.1	(21,969)	18.4	47,688	+	(18.0)	(1.3)	-	(43.1)	(79.2)	(59.4)
Sharon Steel	897,527	9.3	18,658	(20.4)	(144,911)	-	13.3	(56.9)	(51.2)	(52.3)	(88.2)	(7.4)

NONFERROUS METALS

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal year)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Phibro Solomon*	28,911,000	(2.8)	3,164,000	35.3	212,000	(54.9)	13.1	49.3	3.5	15.3	21.2	1.3
Brush Wellman*	322,595	31.4	71,845	50.2	41,539	61.6	14.9	19.9	32.4	12.1	14.5	9.9
Cabot Corp.	1,752,523	12.5	182,518	28.0	97,073	51.3	11.9	10.1	18.6	11.8	16.9	6.6
Freeport McMoran	842,163	7.1	169,651	18.8	94,150	0.7	11.8	11.1	7.0	11.2	16.4	15.2
Newmont Mining	770,081	6.8	(8,154)	(3.1)	41,034	(22.4)	(1.8)	(32.2)	0.0	10.7	(12.1)	16.7
Fluor Corp.*	4,401,130	(17.0)	72,016	(69.1)	1,008	(96.4)	6.9	(2.9)	(25.5)	6.7	8.8	1.7
Olin	2,065,328	6.8	124,376	35.2	88,747	23.7	3.2	11.9	27.4	5.9	8.3	3.5
Alcan Aluminum	5,467,000	5.0	561,000	60.7	253,000	+	5.0	16.6	+	5.7	8.2	4.1
Alcoa*	5,750,800	9.3	536,600	63.1	256,000	47.0	4.0	+	5.5	7.8	4.6	
Martin Marietta*	3,920,400	21.4	286,318	24.7	(191,764)	-	14.6	4.5	(44.7)	4.7	8.2	3.2

NONFERROUS METALS

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Cominco Ltd.*#	1,585,292	15.3	93,640	+	24,179	+	5.0	+	(16.8)	3.5	5.0	2.6
Reynolds Metals*	3,728,300	11.6	229,200	+	137,300	+	3.1	-	-	2.7	4.5	1.7
Kaiser Aluminum	3,192,500	29.3	(2,400)	98.0	(53,900)	28.0	4.2	(47.1)	(32.7)	1.3	1.4	0.8
Asarco	1,325,129	(12.4)	(40,674)	-	(306,080)	-	(4.5)	-	-	(1.1)	(3.2)	(1.7)
Phelps Dodge	910,067	(6.9)	(99,401)	(47.5)	(267,846)	-	(5.2)	(92.9)	(34.2)	(3.5)	(6.0)	(6.5)
Amax	2,398,900	4.8	90,300	+	(238,300)	51.3	(3.3)	97.9	(53.1)	(3.8)	(6.4)	(4.6)
Inco Ltd.	1,468,000	25.1	11,900	+	(77,300)	67.1	1.3	(19.2)	(27.5)	(6.1)	(10.7)	(3.2)

MACHINE TOOLS

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Monarch Machine	68,011	16.1	2,995	+	2,479	+	(2.7)	12.4	64.1	12.6	7.0	
Cross and Trecker	268,309	79.0	(495)	79.4	4,053	9.9	9.2	5.5	(7.3)	12.1	13.0	6.7
Ex-Cell-O Corp.*	1,141,058	19.6	84,602	37.5	56,872	14.2	4.0	1.8	1.6	11.0	12.5	5.0
Cincinnati Mil.	660,517	18.2	30,116	+	18,731	+	0.8	8.2	7.0	7.2	9.5	3.7
Brown and Sharpe	122,190	27.8	6,590	+	7,506	+	(3.3)	+	+	1.9	2.2	0.2
The Gleason Works*	213,869	30.8	1,612	+	(655)	91.5	1.5	(14.7)	(31.5)	1.1	1.0	0.0
Acme-Cleveland*	212,843	23.2	(16,850)	17.7	(11,396)	64.4	(5.2)	(32.6)	(70.7)	(2.7)	(2.6)	(2.7)
Lodge and Shipley	18,136	17.8	(2,561)	24.9	(2,476)	(4.9)	(7.1)	(66.6)	(37.6)	(2.9)	(3.9)	(4.9)

MOTOR VEHICLES

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
General Motors	83,889,900	12.5	4,700,000	(14.7)	4,516,500	21.1	5.6	+	+	6.8	7.9	2.2
Chrysler Corp.*	19,572,700	47.6	2,235,100	+	2,380,000	+	13.4	+	+	4.6	(27.9)	(1.1)
Ford	52,366,400	17.8	3,422,200	89.7	2,906,800	55.7	4.6	+	55.3	1.9	2.2	0.2
American Motors*	4,215,191	28.8	81,427	+	15,469	+	7.9	(46.4)	(49.0)	(19.3)	(45.0)	(4.9)

AUTOMOTIVE EQUIPMENT AND PARTS

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Simpson Ind.*	130,467	41.3	9,692	+	5,595	+	3.5	+	+	10.3	12.2	3.4
Hoover Universal	845,502	8.8	63,016	8.8	36,701	13.1	7.8	6.3	13.1	9.4	13.8	3.7
Echlin Mfg. Co.*	688,971	22.1	76,510	35.3	43,820	42.6	18.4	23.7	30.1	8.5	11.0	4.6
Dana2	3,575,159	24.8	447,690	78.7	191,278	69.6	6.2	22.8	22.4	7.9	10.5	3.9
Arvin Inds.	781,986	30.2	56,277	71.1	30,226	64.8	10.7	19.9	24.4	6.1	8.4	2.7
Barnes Group Inc.*	498,092	12.7	42,966	25.0	18,123	+	3.1	2.2	+	5.1	6.1	1.8
Sheller-Globe*	816,415	34.4	60,832	92.1	34,826	+	9.1	80.7	10.7	4.2	6.5	1.8
Eaton Corp.*	3,509,800	31.3	405,700	+	254,400	+	4.9	40.5a	(12.3)	3.7	5.2	2.0
The Allen Group*	346,502	25.8	22,479	79.0	10,551	71.2	2.8	30.7	(5.4)	3.3	4.1	1.0
Fruehauf Corp.	2,788,200	30.9	182,244	+	85,222	+	4.1	60.8	+	2.3	4.1	0.9
A. O. Smith Corp.*	876,557	10.8	51,969	28.6	(43,161)	-	2.8	+	(66.7)	(3.3)	(5.4)	(1.1)
Hayes-Albion*	218,490	54.1	10,410	+	7,649	+	0.4	35.1	-	(4.7)	(7.1)	(2.5)

FARM AND CONSTRUCTION MACHINERY

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Deere and Co.	4,399,168	10.9	72,795	+	104,944	+	(1.6)	+	39.9	4.3	5.7	2.6
Caterpillar Tractor	6,576,000	21.2	(113,000)	63.5	(428,000)	(24.1)	(1.0)	(13.5)	(45.9)	1.0	0.2	(0.6)
Hesston Corp.*	191,052	(3.5)	16,802	(25.3)	(4,478)	-	(2.8)	(2.1)	(3.1)	(1.5)	(3.1)	(0.6)
Clark Equipment Co.	1,238,179	43.6	36,802	+	24,971	+	(3.9)	80.6	-	(2.1)	(3.1)	(1.2)
Bucyrus-Erie Co.	407,254	(26.2)	13,834	+	8,151	+	(3.6)	0.3	-	(3.8)	(4.0)	(0.4)
American Hoist & D.	328,940	4.2	(7,421)	(65.7)	(13,923)	68.5	5.9	51.3	(48.6)	(4.4)	(7.9)	(3.1)
Massey-Ferguson2	1,468,600	(4.3)	62,200	+	7,200	+	(10.7)	-	-	(12.0)	(45.6)	(7.7)
International Har.*	4,802,397	33.4	178,135	+	(55,441)	88.6	(14.1)	(11.4)	(77.6)	(27.9)	-	(13.8)
Barber-Greene*	114,716	(0.7)	(8,524)	39.0	(22,970)	32.4	(11.0)	-	-	(30.4)	-	(9.1)

AEROSPACE

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
General Dynamics*	7,839,000	9.7	663,300	32.3	381,700	33.2	15.2	24.8	25.0	19.6	20.0	3.6
Gulfstream Aero.25	598,639	12.8	97,148	(15.0)	26,977	(49.2)	37.9	57.3	62.6	16.3	31.2	6.4
United Aircraft Pr.	32,610	12.9	5,019	(7.6)	3,959	22.5	13.9	31.9	25.3	16.3	16.3	10.2
Boeing	10,354,000	(7.0)	356,000	7.2	787,000	+	8.4	(1.7)	20.5	16.1	17.4	5.0

AEROSPACE

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Rockwell Int.*	9,322,100	15.1	798,300	38.1	496,500	27.6	8.7	14.3	14.0	15.0	17.1	4.6
Northrop Corp.	3,687,800	13.1	243,400	73.2	166,900	65.7	18.8	(66.3)	+	12.7	13.8	3.1
Curlew-Wright*	144,349	(20.0)	10,703	(23.7)	1,884	(89.8)	(2.7)	(7.1)	(8.8)	12.5	15.0	17.6
United Tech.	16,331,757	11.3	1,062,506	16.0	645,015	26.7	13.1	10.5	15.2	11.5	14.6	3.6
McDonnell Douglas	9,462,600	19.1	337,200	19.7	325,300	18.3	13.1	75.9	12.5	11.4	11.9	2.9
Grumman Corp.*	2,557,807	15.2	148,818	(7.7)	108,418	(2.1)	11.7	32.6	64.0	9.5	13.1	2.8
Bahr Industries	613,933	7.9	95,846	43.7	37,763	56.5	9.9	19.5	+	8.6	11.7	3.0
Gates Learjet*	406,622	16.0	(7,868)	-	(10,626)	-	10.1	(36.2)	-	8.1	9.5	1.8
Fairchild Ind.	898,852	0.8	(3,312)	-	1,382	(95.1)	8.2	(28.2)	(22.7)	7.1	9.7	3.5
Aerona Inc.*	44,292	1.0	4,661	16.9	4,058	6.9	(3.9)	+	+	6.2	12.0	3.6
Lockheed Corp.*	8,113,400	25.0	649,500	23.2	344,100	30.9	15.6	55.1	-	5.6	(17.9)	1.4
Cessna Aircraft Co.	693,586	32.3	(45,463)	30.4	949	+	(2.7)	-	(18.6)	5.1	5.4	1.5

APPLIANCES

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Mayslag	442,561	7.6	111,567	2.8	63,141	4.0	12.5	12.6	10.1	20.8	22.3	9.6
Whirlpool Corp.	3,137,482	17.6	272,656	6.7	189,565	13.5	7.5	11.0	11.9	15.0	16.1	5.6
Magic Chef	1,054,282	39.8	106,277	+	54,623	+	22.6	70.7	80.0	7.6	10.8	2.6
Roper Corp.	571,644	18.8	39,980	51.5	17,846	55.8	8.5	15.0	28.1	6.9	10.5	1.9
Rangaire Corp.*	72,234	(18.1)	2,571	(7.2)	1,569	(44.3)	(1.5)	(2.9)	13.8	4.7	6.8	2.2

DIVERSIFIED METALWORKING

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
United Industrial	244,155	9.8	24,349	10.0	18,533	10.7	11.5	13.7	21.8	19.6	20.3	6.4
Emerson Electric*	4,178,810	20.2	648,985	21.7	349,203	15.3	9.3	9.8	11.0	17.4	19.1	8.0
Emhart*	1,794,500	6.5	174,800	14.9	90,400	7.2	2.9	11.5	9.8	13.6	16.1	4.5
Core Industries*	148,335	14.1	17,467	32.7	10,744	45.8	1.3	1.0	4.6	13.4	14.2	7.3

DIVERSIFIED METALWORKING

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Vulcan Materials	982,877	19.8	131,492	72.6	78,421	34.8	6.1	10.2	6.5	13.1	16.0	8.4
Trinity Industries*	381,125	(20.1)	(3,965)	-	4,730	(71.3)	14.4	10.3	21.7	13.0	18.4	4.3
Sealed Air Corp.	300,085	17.8	64,686	19.9	41,300	42.2	12.9	16.5	27.5	12.6	14.3	6.9
Westinghouse*	10,264,500	7.7	610,000	27.7	535,900	19.4	6.8	9.1	+	12.6	14.6	4.8
General Signal	1,784,883	13.5	184,284	21.7	108,510	21.0	5.6	2.8	5.5	12.2	13.5	6.4
TRW	6,061,691	10.4	482,688	31.4	266,842	30.1	6.0	5.7	8.2	12.0	14.5	4.1
Low Slinger Inc.	1,941,645	32.6	194,932	41.4	85,145	32.8	8.6	6.7	7.2	11.5	16.4	4.7
Sundstrand Corp.*	1,041,948	14.6	114,919	43.5	66,412	50.1	4.8	4.8	5.3	11.4	15.0	7.2
Whittaker	1,437,036	(10.3)	127,431	0.8	43,870	16.6	7.1	5.2	1.8	11.3	16.2	3.4
Worthington Ind.	577,779	28.5	61,099	37.4	28,453	43.2	17.2	14.2	13.9	11.1	18.4	5.0
Cooper Industries	2,029,915	9.7	229,954	36.1	106,864	50.2	4.3	2.7	5.7	10.9	12.9	6.5
Morrison-Knudsen	2,022,145	(6.6)	91,336	15.5	43,612	5.1	9.1	14.8	11.6	10.7	13.1	1.9
Borg-Warner*	3,915,600	10.5	332,700	30.8	206,100	12.9	7.6	11.5	7.4	10.7	12.5	5.1
Northwest Ind.*	1,431,900	7.1	197,600	20.8	77,500	+	(3.6)	16.8	31.4	10.3	16.0	7.2
EDI Corp.	224,925	16.6	20,616	20.5	8,368	23.1	4.6	16.4	13.1	9.3	16.7	3.0
Federal Mogul Corp.	911,718	22.1	108,772	53.3	48,385	17.8	7.2	8.9	5.3	9.0	13.4	4.8
Harsco	1,161,271	31.2	85,902	+	47,550	72.4	4.6	9.9	5.4	8.6	11.4	4.3
Ceco Corp.	582,585	25.2	21,519	(6.2)	10,252	(12.7)	7.1	(11.9)	(3.7)	8.0	9.6	2.7
Piggie International*	720,686	12.2	49,721	25.9	17,413	(18.5)	1.3	4.7	1.4	7.3	12.3	3.1
The Signal Cos.*	6,005,000	(0.9)	330,000	+	285,000	+	8.5	57.5	22.6	7.3	9.3	3.8
Textron Inc.	3,221,100	8.1	200,500	30.7	113,500	28.0	1.3	(3.7)	3.1	7.1	8.6	3.3
Ogden Corp.*	2,136,675	23.7	81,894	10.5	39,549	(25.3)	(0.2)	(3.5)	(5.8)	6.9	13.5	2.9
The Derwin Co.	139,651	12.9	1,608	(70.6)	(2,183)	-	2.6	(32.2)	(50.7)	6.6	7.9	3.7
Eagle-Picher	643,929	24.6	60,315	79.6	28,142	83.4	3.4	6.9	7.2	6.4	8.5	3.2
Franklin Electric	188,157	11.7	8,649	6.4	6,712	21.5	7.1	+	+	6.3	8.5	2.6
Park-Ohio Ind.	195,314	37.5	10,463	+	5,739	+	3.8	9.5	4.5	6.0	7.8	3.4
Titanium	1,149,908	22.7	54,986	+	46,057	+	(0.6)	+	+	5.7	6.0	3.6
Interlake*	845,087	10.7	73,371	56.2	36,551	60.1	(4.0)	64.1	88.2	5.5	7.4	2.8
AMF*	1,095,271	12.9	38,155	+	14,872	+	(0.4)	+	+	4.1	5.6	2.2
Allegheny Int'l.*	2,115,276	(9.9)	151,392	82.1	14,918	(47.3)	27.4	28.7	(17.1)	3.7	6.7	2.5
Katy Ind.	431,517	7.2	13,241	(49.2)	(36,662)	-	11.8	(7.2)	(76.9)	3.6	3.9	2.8
Koppers*	1,816,646	16.0	54,418	14.7	28,766	(6.0)	0.5	(8.0)	(8.7)	2.7	3.7	1.4
Salem Corp.*	75,053	36.8	(91)	98.1	838	+	4.4	(37.0)	83.7	1.8	2.0	0.2
Dravo Corp.*	844,911	4.3	(19,053)	-	(20,110)	(38.2)	(1.2)	(81.1)	(85.8)	(0.6)	(0.6)	(0.3)
Chromalloy-Am.*	865,646	2.9	39,872	30.2	(4,628)	89.0	(10.1)	(10.1)	(86.1)	(1.5)	(3.1)	(1.2)
Condec*	248,016	(1.2)	22,252	+	(14,659)	-	0.7	(1.7)	-	(3.0)	(21.2)	(1.8)
Valley Industries*	114,679	34.5	(2,507)	57.0	(26,534)	-	3.8	6.0	(46.8)	(9.3)	(17.1)	(5.4)
NVF Co.	1,276,460	27.7	39,233	47.9	(146,520)	-	17.0	(25.5)	-	(24.1)	(72.8)	4.9

METALS FABRICATION AND METAL PARTS

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Raytheon*	5,995,672	6.5	419,021	8.6	243,242	(19.0)	6.9	4.6	1.2	17.1	17.9	5.4
Snap-On Tools Corp.	539,933	18.7	99,475	38.3	59,629	38.8	7.8	7.7	8.3	16.5	18.3	9.6
Toledyne*	3,494,300	17.3	300,700	5.2	574,300	88.5	5.7	(3.4)	16.1	16.1	24.6	12.1
Wyman-Gordon	425,459	11.0	59,467	(23.0)	35,362	(24.3)	1.9	15.8	18.8	15.2	16.9	9.4
Illinois Tool Works	592,253	19.0	93,816	37.6	60,004	21.0	8.6	8.8	8.4	14.7	15.1	9.9
Stanadyne	470,737	25.6	62,169	52.6	33,525	52.0	3.9	26.6	23.7	11.9	14.0	5.3
Bolder Electric Co.	183,716	23.6	16,687	26.2	9,740	25.6	6.1	0.9	3.0	11.8	13.9	6.0
Fleetwood Ent.*	1,420,418	65.5	111,902	+	63,917	+	19.7	+	+	10.2	10.2	1.7
Masco Corp.	1,019,730	(3.7)	201,120	7.1	115,880	8.7	7.5	7.8	9.7	10.2	16.4	10.5
Regal-Beloit Corp.*	57,995	32.1	8,049	55.5	4,186	66.8	9.6	13.9	17.0	10.2	14.3	6.0
Vermont American*	225,895	18.0	30,084	38.6	17,145	21.6	7.1	15.0	22.7	10.0	13.4	5.6
Precision Castparts	93,866	8.3	5,517	(39.8)	3,836	(20.7)	12.8	10.3	18.6	9.1	15.4	4.8
Commercial Metals	1,170,896	36.6	16,293	47.4	9,701	20.0	2.6	(7.1)	(5.5)	8.8	10.6	1.0
Commercial Shearing	204,849	21.4	19,154	+	12,693	+	(2.9)	45.1	30.5	8.8	9.3	4.7
Kennametal Inc.	319,343	18.0	25,205	+	11,960	+	6.1	87.7	67.1	8.7	9.8	5.5
Coachmen Ind.*	521,268	8.9	22,159	(45.9)	14,742	(37.0)	30.5	+	+	7.9	8.7	1.0
SPS Technologies*	266,221	25.5	15,497	+	9,824	+	1.2	13.8	+	7.8	10.3	3.8
Outboard Marine*	921,572	16.9	99,333	16.3	52,736	34.3	4.9	43.5	+	7.1	9.3	3.8
Stewart-Warner	290,364	9.5	15,971	88.4	11,663	+	(4.2)	(6.6)	2.0	6.7	6.7	3.7
Moog*	196,859	18.3	21,397	25.3	7,441	+	12.1	13.9	+	5.7	10.1	4.3
Chicago Rivet	29,732	12.0	2,387	+	1,520	88.8	(3.1)	9.3	+	4.9	5.2	2.8
Nortek Inc.*	506,179	51.9	47,052	67.3	16,900	+	38.3	43.2	51.4	4.9	10.8	3.1
Black and Decker*	1,532,883	31.3	154,225	68.0	95,404	+	6.4	4.8	5.1	4.8	6.3	2.9
Elco Industries	100,109	39.5	10,645	+	4,982	+	3.7	27.4	47.9	4.8	7.1	2.5
Bundy Corp.	192,913	23.7	13,391	+	7,744	+	3.6	+	+	4.7	6.7	2.5
Hi-Shear Ind.*	51,616	(0.5)	5,043	17.1	(2,915)	69.1	(2.3)	(10.2)	(32.0)	4.7	5.8	2.4
NL Industries*	1,360,119	0.4	28,975	+	(141,128)	(31.4)	1.5	39.3	(18.1)	4.4	6.2	2.7
Champion Home	352,881	28.5	11,360	+	7,332	51.3	4.7	+	88.3	4.3	3.8	0.5
Easco Corp.*	571,226	12.0	6,168	(70.2)	(9,002)	-	11.2	4.1	(3.4)	4.1	6.3	1.4
Anadite	57,187	31.1	(2,529)	25.4	(520)	46.1	(2.9)	(98.1)	(17.9)	4.0	4.9	1.4
Quanex Corp.	398,314	33.9	24,277	+	1,979	+	14.8	60.1	29.9	3.1	0.9	0.7
Cameron Iron Works	515,544	(46.1)	(42,655)	-	(178,645)	-	4.3	(16.5)	-	2.8	3.1	0.4
Fischer and Porter	158,803	(3.9)	9,592	(16.1)	4,791	+	(0.5)	14.5	+	2.3	3.1	1.0
Russell, B. & W.*2	163,290	18.4	10,044	+	17,643	+	4.2	+	+	1.8	1.6	0.6
Chicago Pneumatic*	411,020	13.9	31,857	+	16,572	+	(1.4)	71.5	(2.4)	0.4	0.3	0.1
National Standard*	280,752	22.0	10,721	+	7,496	+	(2.4)	+	(50.2)	0.2	8.7	0.0
Acme Precision Pr.	33,841	27.6	764	(51.4)	148	(4.5)	+	86.9	19.4	0.1	1.2	4.6
Amcast Industrial	269,280	54.9	22,649	+	10,003	88.0	11.6	94.4	(95.3)	(0.9)	(2.2)	(0.5)
Toro*	280,249	16.3	16,971	+	8,306	+	(1.9)	15.3	+	(1.5)	(3.2)	(1.0)
GF Business Equip.*	183,130	34.3	(2,705)	(35.8)	(10,148)	-	3.5	-	(22.3)	(2.3)	(7.0)	(1.2)
Keystone Consol.*	208,655	(36.9)	(6,807)	11.7	(3,973)	81.3	(11.6)	-	-	(7.4)	(10.7)	(2.6)

METALS FABRICATION AND METAL PARTS

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Lamson and Sess.*	138,904	39.5	3,976	+	142	+	(6.2)	(96.4)	(66.8)	(29.1)	-	(15.1)

GENERAL INDUSTRIAL MACHINERY

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Newcor*	83,188	17.0	4,717	(25.4)	3,166	11.1	10.6	2.3	11.3	15.3	18.1	4.6
The Gorman-Rupp Co.	68,028	4.8	9,278	8.3	6,685	23.2	3.3	3.1	5.5	14.9	14.9	8.8
Briggs and Stratton	621,193	9.3	62,382	14.8	34,736	9.4	3.6	2.1	1.4	14.3	14.3	5.5
Foster Wheeler*	1,326,859	(13.9)	33,358	(44.4)	35,374	(20.0)	(4.1)	(10.7)	(4.3)	14.1	15.6	3.3
Goulds Pumps Inc.	286,615	4.1	29,922	14.3	20,149	39.9	4.9	(1.5)	4.7	13.8	18.4	7.0
Combustion Eng.	3,057,520	(1.1)	75,347	1.1	99,570	+	2.9	(6.9)	+	12.8	13.9	3.1
Zurn Industries	338,180	(9.4)	18,330	(37.3)	11,025	(44.5)	2.4	(1.9)	(0.5)	11.3	4.7	
Parker-Hannifin*	1,304,817	20.1	134,846	+	71,499	+	8.4	+	18.4	9.8	13.0	4.9
Joy Manufacturing*	675,996	7.6	47,181	20.2	32,945	+	0.2	(0.8)	+	9.7	11.1	5.5
The Oilgear Co.	35,200	21.3	2,838	88.6	2,835	+	2.6	4.8	25.0	9.5	10.1	6.0
Amsted	626,473	27.8	38,211	+	24,200	+	(4.1)	31.7	+	8.7	8.7	4.0
Colt Industries*	1,868,267	18.5	240,919	41.2	132,229	33.2	(1.6)	6.1	(10.5)	8.1	10.5	2.9
FMC Corp.	3,337,839	(4.6)	300,233	49.9	37,968	(77.5)	0.3	12.0	(13.1)	7.6	9.8	3.7
Cummins Engine	2,325,819	44.9	293,042	+	187,944	+	7.7	+	+	7.0	9.9	2.8
Twin Disc Inc.*	115,412	27.7	4,043	+	3,152	+	(2.6)	7.1	6.3	5.9	7.0	2.4
Penna. Eng. Corp.	125,260	(10.3)	(5,579)	-	(1,310)	-	(4.8)	-	(24.0)	5.4	9.5	2.8
Prab Robots Inc.2	18,435	(3.5)	(508)	-	(491)	-	16.9	-	-	4.6	4.7	1.2
Rexnord	921,053	14.5	62,094	+	28,226	+	(1.0)	1.4	91.6	4.3	6.1	2.3
Ingersoll-Rand	2,478,120	9.0	177,621	+	58,895	+	0.8	34.2	(41.4)	3.9	5.6	2.1
White Consol.*	1,905,738	3.1	80,615	(28.2)	(79,334)	-	(0.3)	(6.8)	(51.0)	2.9	4.4	1.2
Portec*3	132,481	16.2	4,684	+	(3,340)	12.5	(9.6)	(27.3)	(92.2)	2.1	2.9	0.4
GATX Corp.	847,300	(0.2)	176,600	11.0	36,700	+	(0.1)	0.7	(66.2)	1.3	3.6	1.8
Crane Co.	792,212	2.7	50,572	97.6	30,965	+	(11.3)	24.4	-	(0.4)	(1.1)(0.9)	
Wean United	105,474	(13.0)	(12,839)	17.3	2,881	+	(9.9)	-	+	(8.7)	(17.5)	(4.5)
Harnischfeger*	398,708	24.2	11,296	+	15,176	+	(3.8)	9.7	+	(9.3)	(11.8)	(3.8)
Selas Corp. of Am.	35,586	58.3	1,037	+	1,414	+	(4.3)	(82.0)	-	(14.9)	(15.4)	(2.5)
Allis-Chalmers*	1,326,362	2.0	(15,306)	72.0	(260,954)	(95.9)	(7.0)	(73.4)	-	(51.2)	(68.4)	(8.4)
Fared Robot Syst.24	16,151	62.5	(3,684)	8.2	(3,202)	(7.5)	+	-	-	(55.8)	-	(73.8)

HEAVY STRUCTURAL FABRICATION

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Todd Shipyards*	622,314	(21.0)	27,635	(26.5)	21,869	(27.5)	11.4	11.9	17.2	17.7	26.0	3.9
CBI Industries*	899,971	8.6	29,273	+	38,657	(12.4)	10.0	88.0	(3.6)	14.4	15.4	7.2
McDermott Int.*	3,088,583	(16.7)	120,883	(32.5)	120,856	+	1.6	13.8	37.3	6.4	9.1	2.8
American Ship.* ws	117,264	81.3	(99)	98.2	4,825	+	8.2	33.8	46.5	6.3	9.3	1.9
Ampco Pittsburgh*	415,653	76.7	13,421	+	5,755	+	17.1	18.1	79.3	3.2	4.9	1.0
Richmond Tank Car	31,363	40.0	(4,219)	62.3	(31,684)	6.1	(2.3)	-	(74.2)	(60.0)	(62.6)	(51.2)

MINING AND METALS PROCESSING

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Englehard Corp.	2,510,974	19.6	100,324	(1.3)	46,317	(37.0)	9.9	7.5	2.3	14.1	15.7	2.7
Homestake Mining*	289,203	(3.5)	4,428	(84.4)	29,158	(48.6)	7.8	18.5	7.0	13.8	14.1	17.6
Hundy and Harman	619,507	7.6	44,990	24.3	14,156	33.4	1.1	3.9	16.3	8.8	13.7	2.6
Cleveland-Cliffs	389,000	25.2	38,000	+	28,600	+	5.2	60.7	+	5.1	5.5	4.3
Hanna Mining Co.	199,574	29.9	(7,319)	37.3	7,652	+	(9.0)	-	(21.4)	(1.1)	(1.4)	(8.9)

AUTOMATION EQUIPMENT, FACTORY AND OFFICE

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Schlumberger	5,978,552	8.4	1,333,439	9.3	1,182,073	9.0	12.0	9.2	14.8	22.6	24.4	20.8
Intergraph*	403,762	60.2	108,524	+	62,936	+	69.1	89.7	92.6	19.9	22.7	10.6
IBM*	45,937,000	14.3	11,231,000	17.1	6,582,000	20.0	15.0	16.7	17.1	19.7	22.3	13.2
3M	7,705,000	9.5	1,286,000	12.9	733,000	9.9	7.3	2.5	3.0	17.3	18.9	10.0
General Electric*	27,947,000	4.3	2,845,000	11.6	2,280,000	12.6	4.6	6.1	10.1	16.5	18.1	7.0
Hewlett-Packard*	6,044,000	28.3	860,000	18.1	665,000	53.9	20.9	16.9	27.6	16.3	16.7	9.3
Litton*	4,605,744	16.3	381,390	14.5	313,380	35.3	3.2	4.3	14.2	16.2	18.8	6.7
E-Systems	819,353	(0.9)	96,782	15.5	61,109	10.6	16.5	26.6	34.1	16.1	17.5	5.2
Automatic Switch	183,927	14.8	35,729	28.3	21,507	25.3	8.7	8.6	8.5	15.4	15.4	11.6
Computervision	556,342	39.1	73,701	44.0	41,441	17.3	41.9	28.7	28.9	15.2	18.6	10.0
Ametek	503,926	12.4	61,812	15.1	42,697	13.1	5.3	7.6	14.7	14.6	19.1	6.9
Square D Co.*	1,365,504	19.3	201,552	58.4	106,153	68.7	10.8	12.9	12.5	14.0	17.8	7.5
Reim Corp.	659,704	31.2	26,499	(51.0)	37,731	6.2	41.0	9.2	27.4	13.8	17.8	7.5
Sanders Assoc.	746,138	29.1	70,383	39.5	43,296	16.9	36.5	29.5	23.4	12.5	14.1	6.2
Wang Labs	2,184,700	42.0	287,800	33.6	210,200	38.3	47.3	39.7	49.9	12.1	19.1	9.5

AUTOMATION EQUIPMENT, FACTORY AND OFFICE

Companies ranked in order of five year average annual return on invested capital

1984

(Dollars in thousands per company fiscal years)

Five Year Growth,Pct

(Average annual growth over five latest fiscal years)

Company	Revenues	Pct. Change From 1983	Operating Profits	Pct. Change From 1983	Net Earnings	Pct. Change From 1983	Revenues	Operating Profits	Net Earnings	Return on Invested Capital	Return on Equity	Return on Sales
Esterline	260,595	29.2	34,415	+	18,037	+	5.8	16.5	22.8	12.0	16.7	6.5
NCR Corp.	4,074,327	9.2	523,071	9.6	342,640	19.1	6.3	6.1	9.0	11.9	13.8	7.3
Perkin-Elmer Corp.	1,182,256	16.4	97,434	25.0	66,088	31.5	11.0	5.2	11.1	11.6	14.0	6.1
Motorola	5,534,000	27.9	500,000	50.2	387,000	58.6	14.2	11.9	20.1	11.0	13.6	5.6
Harris*	1,195,802	10.3	88,139	(3.9)	80,410	15.9	14.8	(4.5)	5.7	10.5	14.5	5.9
Digital Equipment	5,584,426	30.7	394,569	8.7	328,779	15.9	25.7	11.0	16.6	10.4	11.5	8.9
Gerber Scientific*	173,593	48.1	25,952	+	14,677	+	32.8	48.9	59.0	10.3	17.3	6.5
General Instrument	993,848	9.1	4,580	(90.8)	(9,600)	-	7.1	(21.1)	(22.5)	10.2	11.0	6.2
Honeywell*	6,073,600	7.2	454,900	19.8	239,000	3.4	7.8	3.0	(0.8)	9.4	12.1	4.8
Paradyne Corp.*	289,981	38.8	19,273	+	11,048	+	49.8	+	71.3	8.8	9.9	8.5
Courac	154,284	9.3	11,695	(17.9)	13,013	86.3	6.7	0.5	98.1	8.7	11.4	5.4
North American P.*	4,325,900	13.8	265,500	34.0	130,500	36.4	18.2	12.0	13.6	8.3	11.9	2.9
Data General	1,160,815	40.0	102,625	+	83,256	+	18.8	24.0	41.0	8.2	11.0	5.7
Datapoint Corp.	600,154	11.1	51,453	+	28,182	+	21.8	73.1	93.6	7.7	9.2	5.6
Foxboro Co.	515,856	(3.2)	3,101	(42.2)	4,272	(46.4)	2.3	(20.7)	(38.3)	7.6	8.1	4.3
Sperry Corp.	4,914,000	5.4	434,100	28.5	216,200	83.1	3.7	0.0	8.7	7.6	9.8	4.5
ITT Corp.*	12,700,988	1.7	660,250	(20.8)	448,046	(35.6)	(5.5)	(8.6)	21.3	7.1	10.4	4.4
Coherent*	111,406	22.0	8,936	84.6	12,932	+	16.5	82.7	+	6.5	7.4	3.9
CTS Corp.*	327,208	37.2	46,891	+	(2,582)	-	12.7	34.1	(27.4)	6.5	6.6	3.7
GenRad*	249,451	10.1	9,361	(63.0)	10,990	(44.0)	16.2	6.7	+	6.4	7.6	4.7
Cognitronics	14,678	7.9	(1,017)	-	(1,859)	-	13.2	29.0	(30.9)	6.2	6.2	2.3
Gould Inc.*	1,399,400	4.8	104,200	3.5	17,800	(72.2)	11.8	7.7a	(22.4)	6.1	8.3	6.2
Gulton Ind.*	148,033	0.4	11,571	15.9	4,249	(18.5)	(0.6)	13.1	13.2	6.0	7.8	2.3
Ransburg*	164,601	25.4	2,135	(40.9)	(4,938)	-	13.0	(17.0)	-	5.8	6.5	4.4
Research-Cottrell	400,878	3.8	9,517	+	5,275	+	8.0	52.3	27.2	5.7	7.6	1.9
Burroughs Corp.	4,808,300	11.9	421,000	29.6	244,900	24.4	11.8	20.6	15.8	5.5	7.2	4.0
Kyser Industrial*	158,237	33.3	17,368	+	9,356	+	9.0	74.5	+	5.5	8.3	2.8
GTE Corp.*	14,547,344	12.4	2,907,007	11.5	1,215,118	17.7	10.3	9.7	14.5	5.4	12.2	6.7
McGraw-Edition*	1,720,900	16.9	178,900	46.4	10,800	(67.7)	10.3	9.7	(21.2)	4.5	8.3	2.5
CompuDyne*	90,597	14.3	4,529	1.1	218	(71.4)	9.3	6.1	(26.4)	4.1	10.6	1.3
Mark Controls Corp.	280,383	4.3	3,446	(43.9)	(5,815)	-	3.9	(18.5)	(44.7)	2.4	3.4	1.0
Control Data Corp.*	3,755,500	7.1	147,800	(37.1)	31,600	(80.5)	11.0	(0.6)	(10.1)	2.2	8.2	4.2
Mohawk Data Scl.*	402,465	10.7	(2,132)	-	(52,964)	-	13.8	(23.7)	-	1.5	(0.5)	1.2
Apollo Computer5	215,930	+	39,268	+	23,908	82.1	+	+	+	(2.0)	(3.2)	(14.7)
Modcomp	78,497	4.7	4,615	+	3,289	+	2.5	(79.0)	-	(6.1)	(6.9)	(3.9)
Automatix5	20,058	54.2	(15,451)	-	(14,193)	-	+	-	-	(32.1)	(32.1)	(98.6)
CompuCorp*	24,610	(35.7)	(15,182)	-	(16,750)	-	43.6	62.4	(62.6)	(49.1)	(50.5)	(14.0)

*Discrepancies in figures from one source to another

a Canadian dollars

Percent over 99.9% (negative) +Percent over 99.9% (positive)

aAverage for less than 5 years due to missing or conflicting information

2 Differences in fiscal years

Operating Profits equals Revenues minus the sum of: Cost of Sales, Depreciation, and Selling, Administrative and General Expenses. Research and Development Expenses are also reflected in Operating Profits

Return on Invested Capital equals Net Earnings divided by the sum of: Shareholders' Equity and Long-Term Debt. Long-Term Debt includes Capitalized Leases

Return on Equity equals Net Earnings divided by Shareholders' Equity

Return on Sales equals Net Earnings divided by Revenues

Shareholders' Equity includes Common and Preferred Stock, Paid in Capital, and Retained Earnings, but not Minority Interest in Unconsolidated Subsidiaries

Financial Analysis by The Research Assistant, Wayne, Pa.

3 Used total revenues figures to be consistent between sources

4 Company founded in 1981's Company founded in 1980

Sources: Company annual reports and 10-K's, and Moody's Manuals

Definitions: Revenues includes Net Sales, Operating Revenues, and Service Revenues

2ND QUARTER EARNINGS

STEEL HANGS ON; NONFERROUS SLIPS

BY GEORGE J. MCMANUS AND ROBERT REGAN

Despite lower volume and prices, 15 out of the 20 largest domestic steel producers made money in the second quarter, but sluggish growth held many of the nonferrous companies in check.

Steel

The steel industry showed a growing potential for prosperity in the second quarter.

With volume and prices down, 15 out of the 20 largest mills made money. This showing reflected the drastic cost cutting of the last three years.

If prices and shipments ever improve even a little bit, the new cost base should produce a dramatic surge in steel profits. Unhappily, the prospects for improvement were dim as steel producers moved through the third quarter. Demand for steel didn't collapse as it did last summer, but there was no sign, either, of the pickup that had been cranked into most projections.

There was still hope that the voluntary restraint program of the Reagan Administration would reduce steel imports, but there was nothing in market reports or government data to suggest a downturn was near.

In this setting, steel producers weren't relying on external factors for their survival. Predicting second half profits, David M. Roderick, chairman of United States Steel Corp., spoke of "further improvements in operating efficiencies."

In the second quarter, U.S. Steel had an overall net profit of \$133 million and an operating profit of \$85 million in steel. "Despite a market characterized by severe price competition," said Mr. Roderick, "steel and related resources achieved an operating income of \$25 a ton."

Mr. Roderick cited this margin in responding to charges that U.S. Steel was the prime mover in the price cutting. "If we were really cutting price," he said, "that means our price would be below our competition. If our prices were below our competition, logically, we would not be making as much money as our competition."

"In the second quarter," continued Mr. Roderick, "our profit margins per ton were higher than any steel company that has reported profits for this quarter.... I think you should look at some of those companies that are reporting massive losses."

The industry's most massive loss in the second quarter was \$472 million for LTV Corp. This included a charge of \$400 million from the idling of facilities at Aliquippa, Pa. LTV's operating loss on steel was down from the first quarter of 1985, but it was still nearly \$40 million.

LTV clearly must do something about the flow of red ink. The proposed sale of the company's stainless operation will relieve cash pressures but will subtract a profit source. Recent months have seen a shrinking of the Cleveland headquarters staff.

The big success story in the second quarter was Armco, Inc. Armco went from a loss of \$14 million in the second quarter of 1984 to a net profit of \$18.5 million in the second quarter of 1985. Like LTV, however, Armco was in the position of reducing debt by selling off profit-

able divisions. Up for sale was the aerospace and materials group, which earned \$11.6 million in the second quarter.

Bethlehem Steel Corp. kept its head above water in the second quarter. Net earnings of \$20 million were down from the second quarter of 1984 but up from a loss of \$62 million in the first quarter of 1985. There was an inventory profit of \$8 million in the second quarter and a benefit adjustment worth \$7 million.

"It is likely that we will be unprofitable both for the third quarter and for the year," said Donald H. Trautlein, chairman of Bethlehem.

Mildly surprising was the net loss of \$21 million for National Steel Corp. in the second quarter. National specializes in sheet products and these have been the strongest grades in the steel line-up. National Inter-group, Inc., which owns 50 pct of the steel company, continued to be plagued by stockholder agitation.

Inland Steel Co. had a net loss of \$29 million in the second quarter, but this was due to non-recurring charges. Inland's operating profit was \$25 million. A grim note was sounded when the company said its earlier plans to dismiss 700 salary people had been expanded to more than 1,000.

Weirton Steel Corp. continued its impressive showing in the second quarter. The nation's largest employee-owned company earned \$20 million. This was down from \$22.8

(Cont. on p. 88.)

STEEL: MOST STILL IN THE BLACK

SECOND QUARTER PROFIT REPORT—1985 (In Millions of Dollars)

	EARNINGS				SALES		
	1985 E/S	2nd Q 1985	2nd Q 1984	Pct Change	2nd Q 1985	2nd Q 1984	Pct Change
USS	2.6	133.0	140.0	-5.0	5,078.0	4,881.0	+4.0
LTV	—	(472.3)	(22.7)	—	2,120.0	1,580.0	+34.0
BETHLEHEM	1.5	20.4	24.0	-15.0	1,323.0	1,505.1	-12.0
ARMCO	1.9	18.5	(14.1)	—	994.2	1,063.9	-7.0
INLAND	—	(29.6)	22.4	—	790.3	860.0	-8.1
NATIONAL	—	(21.6)	(21.8)	—	547.7	604.8	+9.4
TOTAL	—	(351.6)	127.8	—	10,853.2	10,494.8	+3.4
CYCLOPS	2.7	9.0	5.5	+64.0	338.4	317.1	+6.7
WEIRTON	6.8	20.3	22.8	-11.0	297.2	306.3	-3.0
WHEEL-PGH.	—	(50.1)	5.3	—	245.6	297.1	-12.0
INTERLAKE	3.7	7.7	10.2	-25.0	209.1	220.7	-5.3
NUCOR	6.3	12.2	9.2	+33.0	193.7	169.0	+15.0
CARPENTER	1.8	2.6	12.8	-80.0	144.5	162.9	-11.0
LUKENS	1.0	1.1	3.1	-65.0	111.6	114.0	-2.1
COPPERWELD	0.2	0.2	3.9	-96.0	97.7	124.4	-22.0
QUANEX	5.2	4.1	3.5	+17.0	78.7	106.5	-26.0
FLORIDA	3.5	2.6	0.9	+177.0	74.7	72.1	+3.6
CF&I	3.0	2.1	3.4	-37.0	69.3	89.9	-23.0
EASTMET	—	(4.0)	1.3	—	59.4	69.0	-14.0
LACLEDE	2.8	1.7	2.2	-25.0	58.9	59.3	-0.6
PHOENIX	0.9	0.3	(0.7)	—	31.9	32.6	-2.3

NONFERROUS: TOUGH TIMES FOR ALUMINUM

SECOND QUARTER PROFIT REPORT—1985 (In Millions of Dollars)

	NET INCOME			SALES AND OTHER REVENUES		
	2nd Q 1985	2nd Q 1984	Pct Change	2nd Q 1985	2nd Q 1984	Pct Change
ALCAN	\$(5.0)	\$98.0	—	\$1,493.0	\$1,478.0	+1.0
ALCOA	40.6	112.8	-64.0	1,365.8	1,452.3	-6.0
ALUMAX	12.0	39.4	-69.5	489.0	514.0	-4.9
AMAX	(394.9)	9.8	—	522.6	651.4	-19.8
ASARCO	(20.9)	(28.6)	—	305.9	357.2	-14.4
BRUSH WELLMAN	7.3	10.7	-31.8	72.2	84.6	-14.7
CABOT	14.8	26.5	-44.3	513.7	468.3	+9.7
ECHO BAY MINES	3.0	5.1	-41.2	25.0	20.4	+22.5
ENGELHARD	10.3	18.4	-44.0	479.8	606.0	-20.8
FALCONBRIDGE COPPER	(1.0)	1.0	—	52.3	44.6	+17.3
FALCONBRIDGE LTD.	15.0	8.4	+78.6	245.1	187.7	+30.6
FREEPORT MCMORAN	20.6	25.9	-20.5	405.6	420.5	-3.5
HECLA MINING	1.6	22.9	-93.0	23.3	33.1	-29.6
HOMESTAKE MINING	9.2	5.9	+55.9	94.0	81.4	+15.5
INCO	20.9	(15.1)	—	408.0	385.0	+6.0
KAISER ALUMINUM	(14.3)	32.5	—	878.3	822.0	+6.8
NEWMONT MINING	17.8	12.6	+41.3	171.2	173.1	-1.1
NORANDA	(14.4)	21.4	—	942.2	920.6	+2.3
OLIN	15.8	33.0	-52.1	462.4	481.3	-3.9
PHILIPS DODGE	11.4	(20.7)	—	232.7	246.0	-5.4
PINE POINT	0.8	8.3	-90.4	31.1	37.8	-17.7
REVERE COPPER	6.5	(37.1)	—	114.8	154.4	-25.6
REYNOLDS METALS	4.9	37.3	-86.9	921.5	1,003.1	-8.1
SHERITT GORDON	10.0	3.3	+203.0	147.9	124.6	+18.7
VESTGRON MINES	1.4	(2.4)	—	17.7	1.8	+883.3
VULCAN MATERIALS	25.6	25.6	—	264.6	259.2	+2.1

Alcan Aluminum, Ltd.: Net loss includes \$8 million tax benefit from tax-loss carryforward and \$37 million charge and \$66 million pre-tax charge related to cost of restructuring program. **Aluminum Co. of America:** Net for the 1985 period includes a net charge of \$15.6 million from settlement of litigation related to a subsidiary. **Ammax, Inc.:** Net loss for the 1985 period includes \$350 million provision for losses on properties and investment, including a Louisiana nickel plant, Arizona and New Jersey copper facilities and further write-downs of agricultural chemicals business. Net income for the 1984 period includes \$5.6 million tax benefit from tax-loss carryforward and \$20.7 million gain on sale of coal and gas interests. **Asarco, Inc.:** Net loss for the 1984 period includes a pre-tax charge of \$38 million relating to decision to close the Tacoma, Wash., smelter. **Falconbridge Copper:** Canadian funds. **Falconbridge, Ltd.:** Canadian funds. Net income for the 1984 period excludes \$16.2 million gain on the sale of investment and \$7 million tax benefit from tax-loss carryforward. **Hecla Mining Co.:** Net income for the 1984 period includes \$24.1 million gain on sale of property and \$2.4 million tax benefit from tax-loss carryforward. **Kaiser Aluminum and Chemical Corp.:** Net for

the 1984 period includes \$3.3 million loss from discontinued operations. **Newmont Mining Corp.:** Net for the 1985 period includes \$8.7 million from discontinued operations and a \$676,000 tax benefit from a tax-loss carryforward. Net for the 1984 period includes \$370,000 profit from discontinued operations. **Noranda Inc.:** Canadian funds. **Olin Corp.:** Net income includes \$2.1 million gain in 1985 period and \$3.4 million gain in 1984 period from discontinued operations. **Philips Dodge Corp.:** Net for 1985 period includes \$4.6 million tax benefit from tax-loss carryforward. Net for the 1984 period includes \$100,000 loss from discontinued operations. **Pine Point Mines, Ltd.:** Canadian funds. **Revere Copper & Brass Inc.:** Net for 1985 period includes \$1.96 million benefit from tax-loss carryforward. Net for 1984 period includes a \$4.39 million charge related to a reversal of tax benefit and \$51.7 million provision for settlement of claims in Chapter 11 reorganization. **Reynolds Metals Co.:** Net income for 1985 period includes a \$1.3 million tax benefit from tax-loss carryforward. Net income for 1984 period includes a \$3.2 million charge relating to a bauxite mine closing. **Sheritt Gordon Mines Ltd.:** Canadian funds. **Vestgron Mines Ltd.:** Canadian funds.

million in the second quarter of 1984, but it was up from \$10 million in the first quarter of 1985.

With its big share of the tinplate market, Weirton was one of the few steel companies to be enjoying a brisk summer. "We see the third quarter as the key to another good year for us," said Robert L. Loughhead, chairman and president of Weirton.

The second quarter did nothing to help Wheeling-Pittsburgh Steel Corp. out of bankruptcy. The company lost \$50 million with \$28 million of this coming from a non-recurring charge.

Phoenix Steel Corp. made money in the second quarter and emerged from bankruptcy.

Nonferrous

Sluggish growth held the nonferrous companies in check during the second quarter. Higher prices remained elusive, for the most part, thanks to import pressures and excessive inventories.

One exception was nickel. Higher prices helped Inco, Ltd., and Falconbridge, Ltd., show substantial improvement in operating profits.

Phelps Dodge Corp. moved further into the black (It had a small net profit in the initial 1985 period.) without much help from copper prices, which weren't much different than they were in the second quarter last year.

George Munroe, chairman, credited the effects of cost cutting programs and higher levels of production at the Morenci, Ariz., and Tyrone, N.M., mines. Unit costs came down with the closing of the Ajo, Ariz., mine in the third quarter last year and the closing of smelters at Ajo and Morenci. The company this year also began realizing the benefits of the \$27 million capital improvement program at its Hidalgo, N.M., smelter.

The spot price for copper cathode on the N.Y. Commodity Exchange averaged 61.1¢ a lb in the first half this year and 64.6¢ a lb in the same 1984 period.

Asarco, Inc., pinned its \$29 million net loss for the second quarter

on lower prices for copper and other nonferrous metals, and on costs relating to suspension of operations at several mines and plants over the past year.

The price of silver, an important product for Asarco, averaged \$6.30 an ounce in the second quarter this year, down sharply from the \$8.98 an ounce averaged in the same period of 1984. Asarco also noted that the average producer price for copper slipped to 69.1¢ from 70.5¢ a lb a year earlier. The price of lead also was down sharply.

Asarco Chairman Ralph L. Hennebach said the company has been able to reduce losses from domestic operations through stringent cost-cutting, but equity in results of overseas associates was down about \$25 million. Asarco's overseas interests include participation in MIM Holdings Ltd. of Australia, Southern Peru Copper Corp. and Mexico Desarrollo Industrial Minero SA. Mr. Hennebach said improving fundamentals in the copper market should help future results, barring an economic recession.

Second quarter profits were down in the aluminum sector, reflecting weaker prices for ingot on the international market and their effect on prices for many mill products.

The five largest North American producers, Alcoa, Alcan, Reynolds Metals, Alumax and Kaiser Aluminum, had a 9 pct increase in aggregate shipments to 1.81 million short tons. Aggregate sales and operating revenues of the five companies, however, were down 2.5 pct to about \$5.1 billion.

Aluminum Co. of America showed a 9 pct increase in shipments, but its product mix included a larger portion of primary products. Charles M. Parry, chairman, said earnings were depressed "by persistent price weakness that is rooted in excessive producer inventories and the overpriced U.S. dollar, which is attracting a high volume of aluminum imports." He noted, however, that the dollar's strength has been easing recently and that aluminum imports are trending downward.

Alcan Aluminium, Ltd., which

also had a larger portion of primary metal items in its second quarter shipments, said weak ingot prices continued to depress results of its North American operations. Alcan's \$5 million second quarter loss included a \$37 million after-tax charge relating to costs of a restructuring program based mainly on a cutback in North American personnel. The program, which includes early retirement opportunities, separation packages, and reduced office space requirements, should result in annual pre-tax savings of \$40 million, Alcan said. The program involves about 1,100 employees.

Kaiser Aluminum & Chemical Corp. estimated that steps taken in 1985 will provide wage and salary cost savings of \$85 million a year. Cornell C. Maier, chairman, noted however, that significant cost-cutting measures taken so far did not overcome the impact of lower prices for aluminum mill products. These were more than 12 pct under mill product prices in the same 1984 period, he said.

The Kaiser Aluminum executive said second half operations should benefit from the recently completed \$230 million modernization program at its Trentwood, Wash., rolling mill, which has lowered unit costs and boosted rolling capacity.

Inco converted a second quarter 1984 loss of \$15.1 million into a \$20.9 million profit in the period just ended. The company said its average realized price for primary nickel, excluding intermediates, rose to \$2.50 a lb from \$2.39 a lb in the second quarter last year. Inco entered the second half with 81 million lbs of nickel in inventory, compared with 88 million lbs on hand at the start of the year. Most of the drop in stocks took place in the first quarter, however.

Inco's second quarter results also were helped by a 48 pct increase in silver shipments, a 53.7 pct increase in cobalt shipments and an 18.2 pct increase in copper deliveries. Shipments of nickel in all forms were up 7.7 pct and shipments of gold and platinum-group metals were down 17.4 pct. □

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective August 12, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	173	172	168	183
Pittsburgh	167	153	210	222
Youngstown	93	95	97	82
Lake Erie	120	120	117	124
Detroit	135	140	137	161
Chicago	466	447	495	427
Cincinnati	87	87	92	83
St. Louis	60	70	75	71
Southern	206	196	210	175
Western	84	86	94	67
U.S. Production	1,591	1,566	1,695	1,595

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.30¢—Pickands Mather as of 1/27/81.

86.9¢—U.S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82. and Hanna Mining as of 2/26/82.

**Effective 8/1/83.

NONFERROUS PRICES

(Effective August 12, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	46.37	46.05	8/12/85
Copper (C)	66.00- 67.00	66.50- 67.00	8/ 9/85
Lead	19.00- 21.00	19.50- 21.00	8/ 2/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	225.67	226.60	8/12/85
Titanium Sponge	555.00- 585.00	555.00	4/29/82
Zinc	41.00- 47.00	44.00- 47.00	7/11/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM, 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$230.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$178.00
Cadmium, ton lots	\$1.00-1.25
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per tray oz.	\$326.90
Indium, dollars per tray oz.	\$2.50
Iridium, dollars per tray oz.	\$400.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$320.00-330.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective August 12, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,591	1,566	54,602	60,809
Capacity Utilization Rate	62.4	61.4	66.9	73.7

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	27.582
Pig Iron** (Net ton= 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	\$ 74.17	\$ 74.17	\$ 68.83	\$ 82.17
No. 2 bundles	\$ 53.83	\$ 53.83	\$ 50.50	\$ 50.83

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$ 77.50	\$ 77.50	\$ 72.50	\$ 87.50
No. 1 steel, Philadelphia	72.50	72.50	70.50	80.50
No. 1 steel, Chicago	72.50	72.50	63.50	78.50
No. 1 bundles, Detroit	69.50	69.50	64.50	70.50
Low Phos., Youngstown	70.50	62.50	57.50	80.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	71.50
No. 1 mach'y cast., Phila	93.50	91.50	91.50	98.50
No. 1 mach'y cast., Chi	99.50	99.50	99.50	115.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, block pipe, hot end cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per tray oz.	\$99.00
Platinum, per tray oz.	\$278.00
Rhodium, per tray oz.	\$760.00
Silver ingots, per tray oz.	\$6.28
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Aug. 5—\$68.65	Aug. 8—\$56.81
Aug. 6—\$66.38	Aug. 9—\$58.10
Aug. 7—\$60.49	

Scrap Prices

Brass Mill Scrap

(Cents per lb; over 20,000 lbs. add 1¢ per lb)

	Solids	Turnings
Copper	61	48½
Yellow brass	53½	45
Red brass	57	47¼
Comm. bronze	58¾	48
Mang. bronze	46½	45½
Free cutting rod ends	46	45

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	56
No. 2 copper wire	48
Light copper	39

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	52
No. 2 copper wire	45
Light copper	35
No. 1 composition	46
No. 1 comp. turnings	44
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	30
Radiators	34

Aluminum

New mixed clips	31	— 32
Old sheet	28	— 29
Old cast	28	— 29
Clean dry borings	29	— 30

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	24	— 26
Mixed L.C. clips	20	— 22
Old sheets and cast	20	— 21
Borings and turnings	16	— 18
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 38
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	38	— 40
No. 1 composition turnings	35	— 37
Cocks and faucets	27	— 29
Clean heavy yellow brass	26	— 28
Brass Pipe	27	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	120	— 130
Nickel rod ends	120	— 130
Nickel sheets, clips	120	— 130
Nickel turnings	35	— 45

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

EFFECTIVE AUGUST 12, 1985

[Effective August 12, 1985] Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 77.00 to \$ 78.00
No. 2 hvy. melting	67.00 to 68.00
No. 1 dealer bundles	90.00 to 91.00
No. 1 factory bundles (auto)	87.00 to 88.00
No. 2 bundles	54.00 to 55.00
No. 1 busheling	89.00 to 90.00
Machine shop turnings	7.00 to 8.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	38.00 to 39.00
Low phos. punchings plate	92.00 to 93.00
Heavy turnings	67.00 to 68.00
No. 1 RR hvy. melting	81.00 to 82.00
Rails, 2 ft. and under	95.00 to 96.00
Scrap rails, random lgh	83.00 to 84.00
RR specialties	97.00 to 98.00
No. 1 machinery cast	71.00 to 72.00
Cupola cast	44.00 to 45.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	615.00 to 625.00
18-8 turnings	515.00 to 525.00

Chicago

No. 1 hvy. melting	\$ 72.00 to \$ 73.00
No. 2 hvy. melting	67.00 to 68.00
No. 1 dealer bundles	88.00 to 89.00
No. 1 factory bundles (auto)	82.00 to 83.00
No. 2 dealer bundles	61.00 to 62.00
No. 1 busheling	84.00 to 85.00
Shredder scrap	84.00 to 85.00
Machine shop turnings	42.00 to 43.00
Mixed borings and turnings	44.00 to 45.00
Shoveling turnings	46.00 to 47.00
Cast iron borings	45.00 to 46.00
Low phos. large crop	96.00 to 97.00
Low phos. punchings plate	
1/4 in. and heavier	112.00 to 113.00
Low phos. 2 ft. and under	107.00 to 108.00
No. 1 RR hvy. melting	76.00 to 77.00
Scrap rails random lgh	78.00 to 79.00
Railroad rails	103.00 to 104.00
Rails, 2 ft. and under	101.00 to 102.00
RR couplers and knuckles	94.00 to 95.00
RR car axles	111.00 to 112.00
No. 1 machinery cast	99.00 to 100.00
Stove plate	87.00 to 88.00
Cupola cast	89.00 to 90.00
Steel car wheels	89.00 to 90.00
Stainless	
18-8 bundles and solids	560.00 to 570.00
18-8 turnings	475.00 to 485.00
430 bundles and solids	150.00 to 155.00
430 turnings	120.00 to 125.00

Philadelphia

No. 1 hvy. melting	\$ 71.00 to \$ 74.00
No. 2 hvy. melting	62.00 to 63.00
No. 1 dealer bundles	85.00 to 88.00
No. 2 dealer bundles	44.00 to 47.00
No. 1 busheling	85.00 to 88.00
Shredder scrap	85.00 to 88.00
Machine shop turnings	25.00 to 28.00
Mixed borings and turnings	25.00 to 28.00
Shoveling turnings	41.00 to 44.00
Low phos. 5 ft. and under	81.00 to 84.00
Low phos. 2 ft. punchings	97.00 to 100.00
Electric furnace bundles	89.00 to 92.00
RR specialties	81.00 to 84.00
Rails, 2 ft. and under	100.00 to 103.00
Cupola cast	77.00 to 80.00
Heavy breakable cast	53.00 to 56.00
No. 1 machinery cast	92.00 to 95.00

Detroit

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 54.00 to \$ 55.00
No. 2 hvy. melting	53.00 to 54.00
No. 1 dealer bundles	69.00 to 70.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	68.00 to 69.00
Drop large flashings	44.00 to 45.00
Machine shop turnings	40.00 to 41.00
Mixed borings and turnings	19.00 to 20.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	24.00 to 25.00
Heavy breakable cast	35.00 to 36.00
Mixed cupola cast	50.00 to 51.00
Automobile cast	74.00 to 75.00
Stainless	
18-8 bundles and solids	340.00 to 350.00
18-8 turnings	415.00 to 425.00
430 bundles and solids	115.00 to 125.00

Youngstown

No. 1 hvy. melting	\$ 67.00 to \$ 70.00
No. 2 hvy. melting	56.00 to 59.00
No. 1 dealer bundles	74.00 to 77.00
No. 2 dealer bundles	31.00 to 34.00
Machine shop turnings	26.00 to 29.00
Shoveling turnings	26.00 to 29.00
Low phos. plate	69.00 to 72.00
Electric furnace bundles	73.00 to 76.00
Galvanized bundles	66.00 to 69.00

Cleveland

No. 1 hvy. melting	\$ 55.00 to \$ 58.00
No. 2 hvy. melting	46.00 to 49.00
No. 1 dealer bundles	77.00 to 80.00
No. 1 factory bundles	46.00 to 49.00
No. 2 bundles	27.00 to 30.00
No. 1 busheling	75.00 to 78.00
Machine shop turnings	16.00 to 19.00
Mixed borings and turnings	9.00 to 12.00
Shoveling turnings	24.00 to 27.00
Cast iron borings	18.00 to 21.00
Cut structural & plates, 2 ft. and under	97.00 to 100.00
Low phos. punchings plate	99.00 to 102.00
Drop large flashings	52.00 to 55.00
Foundry steel, 2 ft. & under	69.00 to 72.00
No. 1 RR hvy. melting	63.00 to 66.00
Rails, 2 ft. and under	68.00 to 91.00
Rails, 18 in. and under	92.00 to 95.00
Steel axle turnings	59.00 to 62.00
Railroad cast	91.00 to 94.00
No. 1 machinery cast	90.00 to 93.00
Cupola cast	57.00 to 60.00
Stove plate	56.00 to 59.00
Stainless	
18-8 bundles	385.00 to 395.00
18-8 turnings	335.00 to 345.00
430 bundles	90.00 to 95.00

Buffalo

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 55.00 to \$ 56.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 busheling	70.00 to 71.00
No. 1 dealer bundles	69.00 to 70.00
No. 2 bundles	33.00 to 34.00
Machine shop turnings	17.00 to 18.00
Mixed boring and turnings	17.00 to 18.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	25.00 to 26.00
Low phos. plate	77.00 to 78.00
Structural and plate, 2 ft. and under	79.00 to 80.00
Rails, 2 ft. and under	81.00 to 82.00
Scrap rails, random lgh	65.00 to 66.00
No. 1 machinery cast	76.00 to 77.00
No. 1 cupola cast	58.00 to 59.00

St. Louis

No. 1 hvy. melting	\$ 50.00 to \$ 51.00
No. 2 hvy. melting	39.00 to 40.00
Foundry steel, 2 ft.	48.00 to 49.00
No. 1 dealer bundles	50.00 to 51.00
No. 2 bundles	34.00 to 35.00
Machine shop turnings	15.00 to 16.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	30.00 to 31.00
No. 1 RR hvy. melting	53.00 to 54.00
Rails, random length	59.00 to 60.00
Rails, 18 in. and under	72.00 to 73.00
RR specialties	70.00 to 71.00
Cupola cast	71.00 to 72.00
Heavy breakable cast	49.00 to 50.00
Stove plate	85.00 to 90.00
Steel car wheels	81.00 to 82.00
Rerolling rails	69.00 to 70.00
Unstripped motor blocks	64.00 to 65.00

Birmingham

No. 1 hvy. melting	\$ 76.00 to \$ 77.00
No. 2 hvy. melting	72.00 to 73.00
No. 1 dealer bundles	76.00 to 77.00
No. 2 bundles	51.00 to 52.00
No. 1 busheling	76.00 to 77.00
Shredder scrap	93.00 to 94.00
Machine shop turnings	27.00 to 28.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	39.00 to 40.00
Electric furnace bundles	68.00 to 69.00
Elec. furnace, 3 ft. & under	72.00 to 73.00
Structural and plate, 2 ft.	92.00 to 93.00
No. 1 RR hvy. melting	86.00 to 87.00
Scrap rails, random lgh	80.00 to 81.00
Rails, 2 ft. and under	94.00 to 95.00
Angles and splice bars	84.00 to 85.00
No. 1 cupola cast	86.00 to 87.00
Unstripped motor blocks	76.00 to 77.00

Cincinnati

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 54.00 to \$ 55.00
No. 2 hvy. melting	53.00 to 54.00
No. 1 dealer bundles	64.00 to 65.00
No. 2 bundles	34.00 to 35.00
Machine shop turnings	9.00 to 10.00
Shoveling turnings	59.00 to 60.00
Cast iron borings	15.00 to 16.00
Low phos. 18 in. and under	79.00 to 80.00
Rails, random length	64.00 to 65.00
Rails, 2 ft. and under	74.00 to 75.00
No. 1 cupola cast	59.00 to 60.00
Heavy breakable cast	24.00 to 25.00
Drop broken cast	71.00 to 72.00

New York

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 44.00 to \$ 45.00
No. 2 hvy. melting	35.00 to 36.00
No. 2 dealer bundles	20.00 to 24.00
Mixed borings and turnings	10.00 to 11.00
Machine shop turnings	4.00 to 6.00
Shoveling turnings	10.00 to 12.00
Clean cast, chem. borings	35.00 to 36.00
No. 1 machinery cast	79.00 to 80.00
Mixed yard cast	50.00 to 51.00
Heavy breakable cast	10.00 to 12.00
Stainless	
18-8 prepared solids	520.00 to 540.00
18-8 turnings	420.00 to 440.00
430 prepared solids	90.00 to 110.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 51.00 to \$ 53.00
No. 2 hvy. melting	41.00 to 43.00
No. 1 dealer bundles	53.00 to 55.00
No. 2 bundles	34.00 to 36.00
No. 1 busheling	59.00 to 61.00
Shredder scrap	61.00 to 63.00
Machine shop turnings	12.00 to 14.00
Shoveling turnings	18.00 to 20.00
No. 1 machinery cast	75.00 to 80.00
Mixed cupola cast	46.00 to 48.00
Heavy breakable cast	8.00 to 10.00

San Francisco

No. 1 hvy. melting	\$ 38.00 to \$ 40.00
No. 2 hvy. melting	32.00 to 34.00
No. 1 dealer bundles	29.00 to 31.00
No. 2 dealer bundles	17.00 to 19.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	8.00 to 9.00
No. 1 cupola cast	80.00 to 82.00

Los Angeles

No. 1 hvy. melting	\$ 38.00 to \$ 40.00
No. 2 hvy. melting	32.00 to 34.00
No. 1 dealer bundles	29.00 to 31.00
No. 2 dealer bundles	16.00 to 18.00
Machine shop turnings	13.00 to 14.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	6.00 to 9.00
Elec. furnace, 1 ft. and under (foundry)	70.00 to 72.00
No. 1 cupola cast	72.00 to 74.00

Seattle

No. 1 hvy. melting	60.00 to 62.00
No. 2 hvy. melting	51.00 to 53.00
No. 2 bundles	35.00 to 37.00
No. 1 cupola cast	89.00 to 90.00
Mixed yard cast	80.00 to 82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 80.00
No. 2 hvy. melting, cut 2 ft. and under	70.00
No. 1 dealer bundles	81.00
No. 2 bundles	52.00
Mixed steel scrap	49.00
Rush, new fact. prep'd	81.00
Bush, new fact. unprep'd	71.00
Machine shop turnings	33.00
Short steel turnings	33.00
Mixed borings and turnings	18.00
Cast scrap	87.00

Houston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 72.00 to \$ 73.00
No. 2 hvy. melting	59.00 to 60.00
No. 2 bundles	43.00 to 44.00
Machine shop turnings	15.00 to 16.00
Crushed turnings	33.00 to 34.00
Shredder scrap	79.00 to 80.00
Cut structural plate, 2 ft. and under	100.00 to 101.00
Cut structural plate, 5 ft. and under	84.00 to 85.00
Unstripped motor blocks	60.00 to 61.00
Cupola cast	86.00 to 87.00

PRODUCER KEY With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baron Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens, Inc., Coatesville, Pa.

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston

N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Nelsen Steel & Wire Co., Chicago
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., North Tonawanda, N. Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S10 Seneca Steel Corp., Buffalo, N. Y.

S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh

W3 Weirton Steel Corp., Weirton, W. Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh
W14 Whittar Steel Strip Div., Whittar Industries, Ltd., Detroit

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

	Cities*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)				Hot-Rolled (merch)	Cold Finished	Hot-Rolled 8620 As Rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 8620 As Rolled	Cold-Drawn 4140 Annealed
	Atlanta	25.41	31.70	32.62	26.67	24.65	22.82	20.60	28.62	31.12	45.15	60.50	67.56
	Baltimore	25.36	29.71	34.55	31.60	29.01	28.09	23.33	31.80	46.54	50.09	60.10	66.46
	Birmingham	24.01	28.33	33.23	25.96	23.11	22.93	21.90	28.91	43.29	49.95	60.60	68.74
	Boston	31.38	38.03	42.90	40.70	29.58	29.30	24.56	31.30	37.35	40.76	50.37	55.65
	Buffalo	28.31	34.38	39.47	34.70	27.06	25.44	20.81	29.01	36.43	38.76	46.48	53.50
	Chicago	27.10	33.65	36.70	24.29	21.37	19.53	18.85	24.82	29.01	36.60	44.26	49.91
	Cincinnati	28.00	33.78	36.59	25.00	24.08	19.48	18.23	26.15	30.91	37.71	44.52	49.89
	Cleveland	26.86	32.99	36.30	27.60	23.61	21.75	18.60	24.04	33.76	37.75	44.76	51.24
	Denver	29.83	36.07	35.08	30.85	26.26	23.80	21.04	34.08	43.97	51.10	60.29	64.85
	Detroit	27.74	34.01	37.01	24.20	24.08	20.10	18.61	26.13	30.83	37.38	44.57	50.47
	Houston	26.09	27.75	30.90	32.18	24.38	23.91	21.60	35.02	42.12	42.29	55.65	62.74
	Kansas City	27.96	34.56	37.59	26.87	24.76	20.85	17.95	29.52	36.05	40.14	46.87	51.81
	Los Angeles	25.48	29.99	34.70	28.88	25.67	31.65	26.64	34.41	46.74	50.34	60.30	67.40
	Memphis	22.92	30.88	32.23	26.91	23.85	23.75	21.20	30.26	33.38	44.50	56.48	65.86
	Milwaukee	27.33	33.41	36.49	25.27	24.41	20.88	18.82	24.99	30.58	37.07	43.78	49.90
	New York	29.57	36.02	39.81	36.75	30.03	24.64	22.02	31.77	37.76	41.73	46.90	52.12
	Philadelphia	26.45	33.48	38.45	36.91	27.35	25.70	21.80	28.78	36.98	42.37	50.90	57.27
	Pittsburgh	36.49	38.17	40.78	34.12	32.70	27.38	25.17	27.20	34.96	39.45	46.84	51.06
	Portland	27.28	30.23	35.46	31.35	31.00	34.05	27.09	36.70	45.72	50.95	65.50	.....
	San Francisco	25.38	30.50	34.87	29.04	25.10	29.46	26.71	34.99	48.50	50.84	60.35	67.40
	Seattle	28.00	28.96	35.47	27.92	20.99	27.00	26.70	35.43	43.61	52.61	65.62	66.15
	Spokane	21.04	29.38	35.34	31.74	30.37	33.23	23.00	37.00	39.45	42.47	.....	55.15
	St. Louis	27.41	30.60	35.00	26.75	23.00	19.55	19.18	28.93	34.60	38.39	45.11	50.75
	St. Paul	27.19	32.39	34.23	30.78	23.10	26.12	18.68	28.78	34.06	37.59	44.36	50.29

Base Quantities: All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—1/8" x 1"; Plate 1/4" x 84"; Shapes—L-Beams 6 x 12.5; Hot-rolled bar—Rounds 3/4-2-15/16; Cold finished bar—C 1018—1" rounds; Alloy bar—Hot-rolled 8620—1-5/8" round; Cold drawn—1" round; Hot-rolled 4140—1-5/8" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

Codes identify Producers listed on p. 112. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.)
N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Re-rolling, Midwest	
W5	\$366.00
N4	\$366.00
West	
C6	\$346.00
Carbon Forging, East	
B3(2)	\$473.00
C10, U1	\$473.00
R3	\$453.00
Midwest	
R3, W5	\$453.00
U1	\$473.00
S1, I3	\$473.00
C10	\$473.00
K2	\$473.00
West	
C6	\$420.00
Alloy, East	
R3	\$492.00
B3	\$512.00
U1, C10	\$512.00
Midwest	
W5	\$492.00
U1, I3	\$512.00
C10	\$512.00
R3	\$492.00
S1	\$512.00
West	
C6	\$469.00

Structural

Carbon, East	
B3	22.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3	23.90
T10	23.90
N4	23.90
South	
C16	23.90
T10	22.90
High-Strength, Low Alloy, East	
B3	22.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
South	
C16	23.90
Wide Flange, Carbon, East	
B3	22.90
U1	22.75
J3	23.90
Midwest	
U1	22.75
N4	23.90
I3	23.90
Wide Flange, High-Strength-Low Alloy, East	
U1	24.30
Midwest	
U1	24.30

Strip

Hot-Rolled, Carbon, Cut II Edge—all widths, East	
U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1	23.75
U1, A7	23.75
I3, B3	23.75
M2	22.05
R3	22.05

South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
S10	29.60
P15	24.80
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05

High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge, All widths, (plus extras)^a

Midwest	
M2, R3	22.05
W3, J3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge	
Midwest	
S1	37.05
Alloy, Hot-Rolled, Midwest (plus extras) ^a	
S1	26.10
I4	25.20
Alloy, Cold-Rolled, East (plus extras) ^a	
E4, M8	43.35
B4	49.75
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Hvyr), East

B3	23.75
J3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5	23.75
S1, B3	23.75
I3, A7	23.75
West	
U1	24.25
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2)	28.15
J3	26.15
U1	28.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.85
J3	26.15
D1	26.15
U1, W5	28.15
S1, B3	28.15
I3, A7	28.15
West	
U1	28.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	30.30
U1	30.30
Midwest	
J3, D1, W3	28.00
R3, Y1	28.00
G2, M11	30.00
U1, W5	30.30
S1	30.30
I3	30.30
A7	30.30
West	
U1	30.80
South	
R3	28.00

Enameling, Midwest

U1, S1	29.65
I3, A7	29.65
J3	27.65
Long-Term, Midwest	
W5, A7, U1	31.65

R3	29.35
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Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate

Single Reduced (70 lb)

East	per base box
J3	26.29
U1	28.99
Midwest	
U1	28.99
J3	26.29
M11	27.54
W3	26.29
W5	28.99
West	
U1	29.49
South	
U1	28.99
Double Reduced (55 lb)**	
Midwest	
M11	21.95
J3	21.49
U1	23.38
W3	21.49
W5	23.38
West	
U1	23.88
South	
U1	23.38
Black Plate	
Single Reduced (70 lb)*	
East	
B3	24.81
Midwest	
J3, W3	24.01
I3	24.57
W5	25.55
U1	26.27
M11	26.27
West	
U1	26.27
Double Reduced (55 lb)	
East	
B3	20.49
Midwest	
W5, M11, U1	20.49
J3	18.93
W3	18.93
West	
U1	20.49
South	
U1	20.49

*75 lb—base weight extra 6¢
**50 lb—base weight extra \$1.40

Bars

Carbon Steel, Hot-Rolled

(Special quality)

East	
R3, K3, R5	25.80
J3	25.80
U1	27.05
C10	27.05
B3	27.05
Midwest	
I4	26.00
U1, I3	27.05
R3, T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
T11, S8	31.00
J3(4), I2	31.00
M8, W10	31.00
N1	24.475

R4, B4	33.25
C10	31.00
Midwest	
W10, R3	33.25
J3	31.00
B1	33.45
I2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
West	
R3	37.15
South	
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
R5, K3	27.95
R3, J3	27.95
U1	29.20
B3	29.20
C10	29.20
Midwest	
R3	27.95
I3, C10, U1	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold-Drawn, East	
I2	35.20
R3, N1	37.90
R4	37.10
J3, W10, I2	34.85
T11, S8	34.85
C10	34.85
Midwest	
R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
I2	34.85
B5, M9	38.60
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3	23.25
I4, U1	25.75
P2	23.25
J3	26.75
Midwest	
R3	23.25
I3	25.75
J3, A7	22.80
U1, I4, S1	25.75
R3	26.75
West	
U1	25.75
O2	23.00
South	
R3	25.75
U1	25.75
Alloy East	
B3	31.05
U1, I4	33.55
P2	33.55
J3	34.55
Midwest	
B3	31.05
I4, U1	33.55
West	
O2	31.00
South	
U1	33.55

Wire

Carbon Steel Wire, East

B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

ORDERS SET BASE FOR WIDESPREAD RALLY

Orders picked up a good head of steam in June. They totaled \$107 billion, up a strong 3.6 pct from May. That gain followed a 3.2 pct rise in May.

Not all durable goods producers were carried along by the quickened pace of orders in May and June. Still, the overall strength of the two-month advance holds the promise of a later sharing in the feast by the present laggards.

A scary orders downtrend had set in earlier in the year and this made the May-June gains all the more welcome. Orders tumbled throughout the first four months of the year, and in April they were 5.4 pct below the January volume.

The strong May-June orders showing thus signals a turnaround. This news has given a lift to durable goods producers—either through a step-up in orders flow, or the promise of an imminent step-up.

The gains in orders in June were largely concentrated in a few product lines. Orders received by makers of aircraft and missiles were up a whopping 32 pct—from \$8 billion in May to \$10.6 billion. Also, orders for communications equipment were up better than 18 pct—from \$5.5 billion to \$6.8 billion.

Despite the concentration in orders gains in June, there were few durable goods categories in which orders were down. This broad holding of the line in orders in June suggests that the renewed orders strength may be spreading.

A rising tide for orders across a broad spectrum of durable goods industries is long overdue. For example, in real terms, June orders volume was up less than 4 pct from June a year ago. And many industries didn't share in that slight rise.

The betting seems to be that if interest rates and imports don't go higher, durable orders will rise.

Billions of Dollars, Seasonally adjusted
Monthly Total, unless otherwise noted
Source: U.S. Dept. of Commerce

Latest Month or Qtr. Previous Month or Qtr. Same Period Year Ago

CAPITAL EXPENDITURES (Annual Rates)

U.S. Industry, Total	3rd Qtr*	\$392.6	\$385.3	\$361.1
Manufacturing, Total	3rd Qtr*	160.8	155.5	142.0
Manufacturing, Durable Goods	3rd Qtr*	77.8	75.7	68.3
Mining Industry	3rd Qtr*	16.2	16.5	17.0

KEY INDICATORS, Durable Goods Manufacturing

New Orders	June	106.7	103.0	98.3
Shipments	June	102.8	102.7	97.7
Inventories	June	192.5	191.5	182.5
Unfilled Orders	June	349.1	345.1	344.6

NEW ORDERS, METALWORKING

Capital Goods Producers, Nondefense Industries	June	28.3	25.6	27.7
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Capital Goods Producers, Defense Industries	June	11.0	8.8	6.8
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Primary Metals, Total	June	10.6	10.6	10.0
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Steel (SIC 331)	June	4.4	4.2	3.7
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Iron & Steel Castings (SIC 332)	June	1.2	1.2	1.2
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Nonferrous Metals	June	5.0	5.0	4.9
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Nonelectrical Mach.-Equip. Industries, Total	June	17.8	17.3	18.3
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Engines & Turbines	June	1.5	1.0	1.4
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Farm Machinery & Equipment (Shipments)	June	0.8	0.9	0.9
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Construction, Mining & Mat. Hdlg. Equip	June	2.8	2.7	2.9
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General Industrial Machinery	June	1.5	1.3	1.5
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Fluid Power Equipment** (Index-1972 = 100)	June	250.0	283.0	300.0
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Metalworking Machinery	June	1.0	0.9	0.8
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Machine Tools, Total (\$Mill., Unadjusted)***	June	235.0	222.7	191.8
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Machine Tools, Metalcutting***	June	182.9	170.7	131.0
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Machine Tools, Metalforming***	June	52.1	52.0	60.8
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Electrical Mach. & Equip. Industries, Total	June	16.4	14.9	16.3
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Elec. Transmission Equip. & Ind. Apparatus	June	2.0	2.0	2.0
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Household Appliances	June	1.5	1.4	1.5
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Communication Equipment	June	6.8	5.5	5.4
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Transportation Equipment, Total	June	28.1	26.4	23.6
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Motor Vehicles & Parts (Shipments)	June	15.3	16.8	14.9
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Aircraft, Missiles & Parts	June	10.6	8.0	7.2
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Shipbuilding & Military Tanks	June	1.3	1.0	0.8
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Fabricated Metal Products, Total	June	13.4	13.6	11.2
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Instruments, Total	June	4.9	4.8	4.5
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*Est. — Commerce Dept. **Source: National Fluid Power Assn. ***Source: NIMBA.

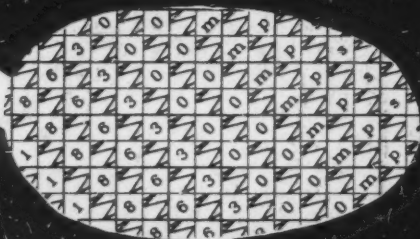
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CHILTON'S

September 20, 1985

IRON AGE

MANUFACTURING MANAGEMENT



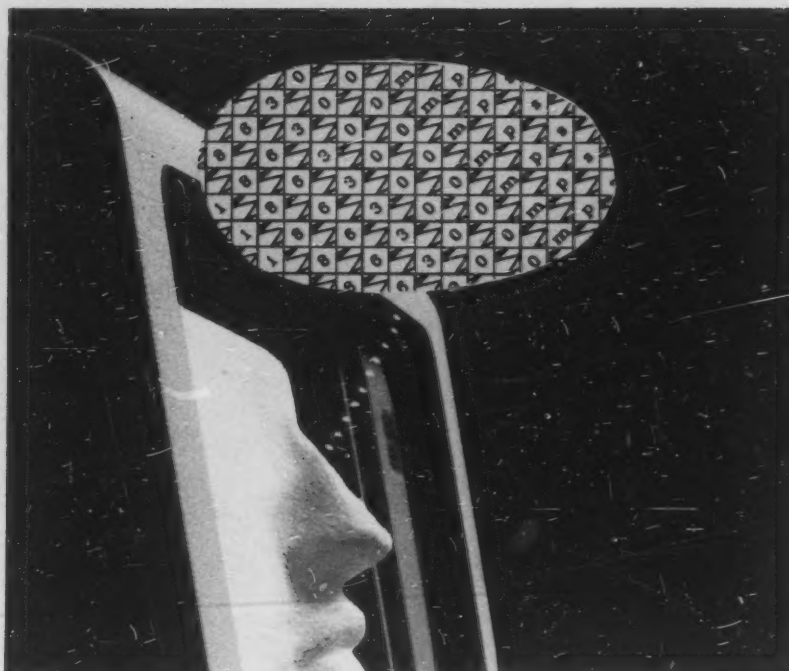
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MANUFACTURING MANAGEMENT



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ONE OF THE ABC PUBLISHING COMPANIES

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective August 26, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	168	184	162	180
Pittsburgh	165	159	179	222
Youngstown	94	97	88	96
Lake Erie	129	124	121	132
Detroit	141	135	164	111
Chicago	492	461	451	467
Cincinnati	96	86	90	86
St. Louis	70	57	71	72
Southern	191	201	212	149
Western	77	75	92	89
U.S. Production	1,623	1,579	1,630	1,623

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-86.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81.

86.9¢—U.S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82. and Hanna Mining as of 2/26/82.

**Effective 8/1/83.

NONFERROUS PRICES

(Effective August 26, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum	46.27	46.35	8/26/85
(LME)			
Copper (C)	65.00-	65.50-	
	66.00	66.00	8/23/85
Lead	19.00	19.00-	
		21.00	8/18/85
Magnesium			
Ingot	148.00	143.00	5/25/84
Nickel (LME)	218.90	222.56	8/26/85
Titanium			
Sponge	555.00-	555.00	
	585.00		4/29/82
Zinc	41.00	41.00-	
		47.00	8/19/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$236.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$197.00
Cadmium, ton lots	\$1.00-1.25
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per tray oz.	\$337.65
Indium, dollars per tray oz.	\$2.50
Iridium, dollars per tray oz.	\$430.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$320.00-330.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

STEEL PRODUCTION, COMPOSITE PRICES

(Effective August 26, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,623	1,579	57,588	63,912
Capacity Utilization Rate	63.7	61.9	66.4	72.9

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base*				
(¢/lb.—off. 7/1/84)	27.582	27.582	27.582	27.582
Pig Iron** (Net ton= 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	\$74.17	\$74.17	\$71.17	\$82.50
No. 2 bundles	\$53.83	\$53.83	\$51.17	\$51.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$77.50	\$77.50	\$77.50	\$87.50
No. 1 steel, Philadelphia	72.50	72.50	72.50	81.50
No. 1 steel, Chicago	72.50	72.50	63.50	78.50
No. 1 bundles, Detroit	71.50	69.50	69.50	70.50
Low Phos., Youngstown	70.50	70.50	57.50	80.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	71.50
No. 1 mach'y cast., Phila	93.50	93.50	91.50	98.50
No. 1 mach'y cast., Chi	99.50	99.50	99.50	115.50

*Finished Steel Composite. Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite. Based on average prices for basic and foundry pig iron at representative producing points within the U.S.

***Steel Scrap Composite. Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Nickel electro (PDCR)	\$3.29
Palladium, per tray oz.	\$106.25
Platinum, per tray oz.	\$327.00
Rhodium, per tray oz.	\$900.00
Silver ingots, per tray oz.	\$6.30
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Aug. 19—\$70.08	Aug. 22—\$68.70
Aug. 20—\$68.64	Aug. 23—\$69.34
Aug. 21—\$67.26	

Scrap Prices Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	59	48 1/2
Yellow brass	52 1/8	44 1/4
Red brass	55 1/8	46 1/2
Comm. bronze	56 1/2	47
Mang. bronze	45 3/4	44 1/4
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	54
No. 2 copper wire	46
Light copper	37

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	50
No. 2 copper wire	42
Light copper	33
No. 1 composition	45
No. 1 comp. turnings	44
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	30
Radiators	34

Aluminum		
New mixed clips	31	— 33
Old sheet	28	— 30
Old cast	28	— 30
Clean dry borings	29	— 31

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	24	— 26
Mixed L.C. clips	20	— 22
Old sheets and cast	20	— 21
Borings and turnings	16	— 18
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	44	— 46
No. 2 copper wire	36	— 38
Light copper	31	— 33
Radiators	30	— 31
No. 1 composition	38	— 40
No. 1 composition turnings	35	— 37
Cocks and faucets	27	— 29
Clean heavy yellow brass	26	— 28
Brass Pipe	27	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	120	— 130
Nickel rod ends	120	— 130
Nickel sheets, clips	120	— 130
Nickel turnings	35	— 45

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

EFFECTIVE AUGUST 26, 1985

(Effective August 26, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 77.00 to \$ 78.00
No. 2 hvy. melting	67.00 to 68.00
No. 1 dealer bundles	90.00 to 91.00
No. 1 factory bundles (auto)	90.00 to 91.00
No. 2 bundles	54.00 to 55.00
No. 1 busheling	89.00 to 90.00
Machine shop turnings	7.00 to 8.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	38.00 to 39.00
Low phos. punchings plate	92.00 to 93.00
Heavy turnings	67.00 to 68.00
No. 1 RR hvy. melting	81.00 to 82.00
Rails, 2 ft. and under	95.00 to 96.00
Scrap rails, random lgth	83.00 to 84.00
RR specialties	97.00 to 98.00
No. 1 machinery cast	71.00 to 72.00
Cupola cast	64.00 to 65.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	615.00 to 625.00
18-8 turnings	515.00 to 525.00

Chicago

No. 1 hvy. melting	\$ 72.00 to \$ 73.00
No. 2 hvy. melting	67.00 to 68.00
No. 1 dealer bundles	88.00 to 89.00
No. 1 factory bundles (auto)	82.00 to 83.00
No. 2 dealer bundles	61.00 to 62.00
No. 1 busheling	84.00 to 85.00
Shredder scrap	84.00 to 85.00
Machine shop turnings	42.00 to 43.00
Mixed borings and turnings	44.00 to 45.00
Shoveling turnings	46.00 to 47.00
Cast iron borings	45.00 to 46.00
Low phos. large crop	96.00 to 97.00
Low phos. punchings plate	
1/4 in. and heavier	112.00 to 113.00
Low phos. 2 ft. and under	102.00 to 103.00
No. 1 RR hvy. melting	76.00 to 77.00
Scrap rails random lgth	78.00 to 79.00
Roller rails	103.00 to 104.00
Rails, 2 ft. and under	101.00 to 102.00
RR couplers and knuckles	94.00 to 95.00
RR car axles	111.00 to 112.00
No. 1 machinery cast	99.00 to 100.00
Cupola cast	87.00 to 88.00
Steel plate	89.00 to 90.00
Steel car wheels	89.00 to 90.00
Stainless	
18-8 bundles and solids	560.00 to 570.00
18-8 turnings	475.00 to 485.00
430 bundles and solids	150.00 to 155.00
430 turnings	120.00 to 125.00

Philadelphia

No. 1 hvy. melting	\$ 71.00 to \$ 74.00
No. 2 hvy. melting	62.00 to 65.00
No. 1 dealer bundles	85.00 to 88.00
No. 1 factory bundles	44.00 to 47.00
No. 2 dealer bundles	85.00 to 88.00
No. 1 busheling	85.00 to 88.00
Shredder scrap	85.00 to 88.00
Machine shop turnings	25.00 to 28.00
Mixed borings and turnings	25.00 to 28.00
Shoveling turnings	41.00 to 44.00
Low phos. 5 ft. and under	81.00 to 84.00
Low phos. 2 ft. punchings	99.00 to 102.00
Electric furnace bundles	89.00 to 92.00
RR specialties	81.00 to 84.00
Rails, 2 ft. and under	102.00 to 105.00
Cupola cast	77.00 to 80.00
Heavy breakable cast	53.00 to 56.00
No. 1 machinery cast	92.00 to 95.00

Detroit

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 56.00 to \$ 57.00
No. 2 hvy. melting	55.00 to 56.00
No. 1 dealer bundles	71.00 to 72.00
No. 2 bundles	32.00 to 33.00
No. 1 busheling	70.00 to 71.00
Drop forge flashings	46.00 to 47.00
Machine shop turnings	42.00 to 43.00
Mixed borings and turnings	21.00 to 22.00
Shoveling turnings	42.00 to 43.00
Cast iron borings	26.00 to 27.00
Heavy breakable cast	35.00 to 36.00
Mixed cupola cast	50.00 to 51.00
Automobile cast	74.00 to 75.00
Stainless	
18-8 bundles and solids	540.00 to 550.00
18-8 turnings	415.00 to 425.00
430 bundles and solids	115.00 to 125.00

Youngstown

No. 1 hvy. melting	\$ 69.00 to \$ 72.00
No. 2 hvy. melting	58.00 to 61.00
No. 1 dealer bundles	76.00 to 79.00
No. 2 dealer bundles	33.00 to 36.00
Machine shop turnings	26.00 to 29.00
Shoveling turnings	26.00 to 29.00
Low phos. plate	69.00 to 72.00
Electric furnace bundles	73.00 to 76.00
Galvanized bundles	66.00 to 69.00

Cleveland

No. 1 hvy. melting	\$ 58.00 to \$ 61.00
No. 2 hvy. melting	49.00 to 52.00
No. 1 dealer bundles	80.00 to 83.00
No. 1 factory bundles	69.00 to 72.00
No. 2 bundles	30.00 to 33.00
No. 1 busheling	78.00 to 81.00
Machine shop turnings	18.00 to 21.00
Mixed borings and turnings	9.00 to 12.00
Shoveling turnings	26.00 to 29.00
Cast iron borings	18.00 to 21.00
Cut structural & plates,	
2 ft. and under	102.00 to 105.00
Low phos. punchings plate	102.00 to 105.00
Drop forge flashings	54.00 to 57.00
Foundry steel, 2 ft. & under	71.00 to 74.00
No. 1 RR hvy. melting	65.00 to 68.00
Rails, 2 ft. and under	90.00 to 93.00
Rails, 18 in. and under	94.00 to 97.00
Steel axle turnings	59.00 to 62.00
Railroad cast	91.00 to 94.00
No. 1 machinery cast	90.00 to 93.00
Cupola cast	57.00 to 60.00
Stove plate	56.00 to 59.00
Stainless	
18-8 bundles	385.00 to 395.00
18-8 turnings	335.00 to 345.00
430 bundles	90.00 to 95.00

Buffalo

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 55.00 to \$ 56.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 busheling	70.00 to 71.00
No. 1 dealer bundles	69.00 to 70.00
No. 2 bundles	33.00 to 34.00
Machine shop turnings	17.00 to 18.00
Mixed boring and turnings	17.00 to 18.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	25.00 to 26.00
Low phos. plate	77.00 to 78.00
Structural and plate,	
2 ft. and under	79.00 to 80.00
Rails, 2 ft. and under	81.00 to 82.00
Scrap rails, random lgth	65.00 to 66.00
No. 1 machinery cast	76.00 to 77.00
No. 1 cupola cast	58.00 to 59.00

St. Louis

No. 1 hvy. melting	\$ 50.00 to \$ 51.00
No. 2 hvy. melting	39.00 to 40.00
Foundry steel, 2 ft.	48.00 to 49.00
No. 1 dealer bundles	50.00 to 51.00
No. 2 bundles	34.00 to 35.00
Machine shop turnings	15.00 to 16.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	30.00 to 31.00
No. 1 RR hvy. melting	53.00 to 54.00
Rails, random length	59.00 to 60.00
Rails, 18 in. and under	72.00 to 73.00
RR specialties	70.00 to 71.00
Cupola cast	71.00 to 72.00
Heavy breakable cast	49.00 to 50.00
Stove plate	89.00 to 90.00
Steel car wheels	81.00 to 82.00
Rolling rails	69.00 to 70.00
Unstripped motor blocks	64.00 to 65.00

Birmingham

No. 1 hvy. melting	\$ 76.00 to \$ 77.00
No. 2 hvy. melting	72.00 to 73.00
No. 1 dealer bundles	76.00 to 77.00
No. 2 bundles	51.00 to 52.00
No. 1 busheling	76.00 to 77.00
Shredder scrap	93.00 to 94.00
Machine shop turnings	27.00 to 28.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	39.00 to 40.00
Electric furnace bundles	68.00 to 69.00
Elec. furnace, 3 ft. & under	72.00 to 73.00
Structural and plate, 2 ft.	93.00 to 94.00
Structural and plate, 4 ft.	88.00 to 89.00
No. 1 RR hvy. melting	88.00 to 89.00
Scrap rails, random lgth	80.00 to 81.00
Rails, 2 ft. and under	94.00 to 95.00
Angles and splice bars	86.00 to 87.00
No. 1 cupola cast	86.00 to 87.00
Unstripped motor blocks	76.00 to 77.00

Cincinnati

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 54.00 to \$ 55.00
No. 2 hvy. melting	53.00 to 54.00
No. 1 dealer bundles	64.00 to 65.00
No. 2 bundles	34.00 to 35.00
Machine shop turnings	9.00 to 10.00
Shoveling turnings	11.00 to 12.00
Cast iron borings	15.00 to 16.00
Low phos. 18 in. and under	79.00 to 80.00
Rails, random length	64.00 to 65.00
Rails, 2 ft. and under	74.00 to 75.00
No. 1 cupola cast	59.00 to 60.00
Heavy breakable cast	24.00 to 25.00
Drop broken cast	71.00 to 72.00

New York

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 44.00 to \$ 45.00
No. 2 hvy. melting	41.00 to 43.00
No. 2 dealer bundles	20.00 to 24.00
Mixed borings and turnings	10.00 to 11.00
Machine shop turnings	4.00 to 6.00
Shoveling turnings	10.00 to 12.00
Clean cast, chem. borings	35.00 to 36.00
No. 1 machinery cast	79.00 to 80.00
Mixed yard cast	50.00 to 51.00
Heavy breakable cast	10.00 to 12.00
Stainless	
18-8 prepared solids	520.00 to 540.00
18-8 turnings	420.00 to 44.00
430 prepared solids	90.00 to 100.00
410 solids	80.00 to 90.00

Boston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 51.00 to \$ 53.00
No. 2 hvy. melting	41.00 to 43.00
No. 1 dealer bundles	53.00 to 55.00
No. 2 bundles	34.00 to 36.00
No. 1 busheling	59.00 to 61.00
Shredder scrap	61.00 to 63.00
Machine shop turnings	12.00 to 14.00
Shoveling turnings	18.00 to 20.00
No. 1 machinery cast	75.00 to 80.00
Mixed cupola cast	46.00 to 48.00
Heavy breakable cast	8.00 to 10.00

San Francisco

No. 1 hvy. melting	\$ 38.00 to \$ 40.00
No. 2 hvy. melting	32.00 to 34.00
No. 1 dealer bundles	29.00 to 31.00
No. 2 dealer bundles	17.00 to 19.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	8.00 to 9.00
No. 1 cupola cast	80.00 to 82.00

Los Angeles

No. 1 hvy. melting	\$ 38.00 to \$ 40.00
No. 2 hvy. melting	32.00 to 34.00
No. 1 dealer bundles	29.00 to 31.00
No. 2 dealer bundles	16.00 to 18.00
Machine shop turnings	13.00 to 14.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	8.00 to 9.00
Elec. furnace, 1 ft. and under	
(foundry)	70.00 to 72.00
No. 1 cupola cast	72.00 to 74.00

Seattle

No. 1 hvy. melting	60.00 to 62.00
No. 2 hvy. melting	51.00 to 53.00
No. 2 bundles	35.00 to 37.00
No. 1 cupola cast	89.00 to 90.00
Mixed yard cast	80.00 to 82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 82.00
No. 2 hvy. melting, cut 2 ft. and under	72.00
No. 1 dealer bundles	83.00
No. 2 bundles	54.00
Mixed steel scrap	51.00
Bush. new fact. prep'd	83.00
Bush. new fact. unprep'd	73.00
Machine shop turnings	35.00
Short steel turnings	35.00
Mixed borings and turnings	20.00
Cast scrap	89.00

Houston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$ 72.00 to \$ 73.00
No. 2 hvy. melting	59.00 to 60.00
No. 2 bundles	43.00 to 44.00
Machine shop turnings	15.00 to 16.00
Crushed turnings	33.00 to 34.00
Shredder scrap	79.00 to 80.00
Cut structural plate, 2 ft. and under	100.00 to 101.00
Cut structural plate, 5 ft. and under	84.00 to 85.00
Unstripped motor blocks	60.00 to 61.00
Cupola cast	66.00 to 67.00

PRICE SOFTNESS LEADS TO PROFIT SOFTNESS

There is little news these days in writing about prices. As one economist has said, "Prices just sit there."

Too, it has been a long time that prices have just sat there.

In July, prices of producers' finished goods rose by 0.3 pct. That slight change fit right into the price-move pattern that has marked the past 12 months.

Since July of last year, monthly price changes have ranged between -0.2 pct and +0.4 pct. And the net price rise over the 12-month period came to 0.9 pct.

The price trend of the 22 metalworking product lines listed in the *Iron Age* table just about matched the price change pattern for all finished goods. The monthly price moves of these metalworking lines ranged from -0.1 pct to +0.6 pct.

U.S. manufacturers are finding that price softness is a mixed blessing. It is great to be able to buy goods for low prices. And price stability is fine for corporate planning. But price softness goes hand-in-glove with buyers' markets. That means it becomes tougher for companies to earn good profits.

The current business recovery period, which has featured remarkable inflation control, has also been marked by sluggish profits. After almost three years of business recovery, profits of U.S. corporations have not yet returned to pre-recession levels.

Price softness—in terms of sellers' price tags—is the chief reason for the intensive and extensive cost-cutting drives seen recently in U.S. industry. And few economists see any near-term end to the price softness. That prospect spells bad news for profits.

So, perhaps after all, there is something newsworthy about prices "that just sit there."

Latest Month Covered: July 1985

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	397.2	+ 0.1	+ 3.4
Metal Forming Machine Tools	435.0	+ 0.3	+ 2.4
Agricultural Machinery & Equip.	339.0	- 0.1	+ 0.1
Construction Machinery & Equip.	362.3	+ 0.1	+ 1.1
Industrial Process Furnace & Ovens	385.1	+ 0.1	+ 2.8
Industrial Material Handling Equip.	295.4	+ 0.2	+ 2.0
Pumps, Compressors & Allied Equip.	356.4	+ 0.1	+ 1.8
Fluid Power Equip. (Dec. 1970 = 100)	265.3	+ 0.6	+ 1.6
Mechanical Power Transmission Equip.	340.1	+ 0.1	+ 4.2
Automobiles	228.8	- 0.1	+ 3.5
Motor Trucks—Light	293.5	+ 0.1	+ 4.2
Motor Trucks—Heavy	333.3	0	+ 0.7
Railroad Equipment	362.7	0	+ 1.7
Fabricated Metal Structural Products	314.6	- 0.1	+ 0.9
Electric Motors	351.8	- 0.1	+ 3.3
Valves & Fittings (Dec. 1982 = 100)	104.9	0	+ 2.7
Ball & Roller Bearings	353.5	- 0.1	+ 3.0
Cutting Tools & Accessories	285.9	0	+ 2.5
Heating Equipment	260.5	+ 0.3	+ 2.1
Plumbing Fixtures & Brass Fittings	313.1	0	+ 3.4
Metal Containers	358.1	0	+ 2.9
Miscellaneous Metal Products	303.0	+ 0.2	+ 3.0

Data based on U.S. Labor Dept.'s Producer Price Index

CHILTON'S

October 4, 1985

IRON AGE

MANUFACTURING MANAGEMENT

4TH QUARTER MANUFACTURING FORECAST:

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STILL GOING**



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SRI ACQUISITIONS
4520 EAST WEST HWY
BETHESDA
MD 20814

**COMPOSITES—
THEY'RE CLOSER
THAN YOU THINK**

IRON AGE

MANUFACTURING MANAGEMENT



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ONE OF THE ABC PUBLISHING COMPANIES

ASK NOW ABOUT OVERSEAS WORK

If a manager is interested in possibly going with the international operations of his company, now is a good time to ask his boss about it. Reason: The high-valued U.S. dollar has "drastically reduced the cost of employing U.S., executives in other major countries," according to a recent analysis by The Conference Board.

Board analysts pointed out that it is customary for companies to pay special living cost allowances to their foreign-based executives "to help them to maintain their customary living standards while serving abroad." It is these living cost allowances that have dropped sharply in nearly all major cities covered by the analysis.

The board gave examples: For executives earning \$60,000 a year in New York, living cost allowances for 1985 are running only \$4,909 a year in Geneva, down from \$12,536 last year. In Rome, allowances are now running at \$334, down from \$4,433 last year.

It was noted that even in high-cost Tokyo, living cost allowances for U.S. managers have declined to \$15,920, down from \$21,759 last year.

The soaring dollar has eliminated all living cost allowances in such cities as Copenhagen, Frankfurt, Stockholm and Sydney.

J. Frank Gaston, the board's director of Special International Studies, said, "The dollar's effect even outweighs the generally faster price inflation prevailing abroad."

Mr. Gaston added that the recent general weakening of the dollar "has not significantly altered the trends reported in most countries."

So, if a manager is yearning to work in overseas operations of his company, he can at least tell his boss it would cost the company only a little extra in living cost allowances. It

just might help his chances.

It is true, however, that there has been a general weakening of the dollar since February of this year. Still, Mr. Gaston noted that, "it has not significantly altered the trends reported in most countries."

Directors see shift in critical issues

There is a shift going on in just what corporate directors think are the most important issues to them. This is shown in the recent 12th annual directors study made by industrial relations consultants at Korn/Ferry International.

The results, published recently by the accounting firm, Deloitte Haskins + Sells, covered 600 of the 1,000 largest U.S. corporations.

As seen in the box here, directors now rank financial results as having No. 1 importance to them. However, looking ahead five years, the directors ranked strategic planning in first place. This represents a big shift from the 'spreadsheet management' approach that has been so prominent in U.S. corporations.

Strategic management is set for new prominence in the future. As noted, it will rank No. 1 some five years from now. This shift may reflect the great deal of restructuring now going on in U.S. business. The restructuring encompasses almost all areas of corporate strategy.

Lastly, the issue of managerial succession, as noted in the box, will be gaining in importance. This again, may well reflect restructuring where corporate organization pyramids are flattened. Critical to this streamlining is getting the 'right' managers in the 'right' slots. Succession management becomes critical.

Notably, in the study it was shown that corporate directors did not give high ranking to merger and acquisition activity.

The high-valued U.S. dollar is making it less costly for companies to employ American managers overseas. This may mean more overseas jobs.

How Directors Rank Corporate Issues

(Pct Per No. 1 in Importance)

Financial Results	Strategic Planning	Managerial Succession
Currently		
50%	20%	7%
5 Years From Now		
37%	44%	17%

Source: Korn/Ferry International

BY JOHN BAXTER



Business in the closing quarter should hold up fairly well. The period is already launched, and there seems to be sufficient forward roll in the economy to assure continued growth through year's end.

There's a good likelihood that the fourth quarter might turn out to be the best quarter of the year. But that is not saying much. The first two quarters of the year were clunkers. Gross National Product, in real terms, in those quarters grew at annual rates of 0.3 pct and 2.0 pct, respectively. Many forecasters see third quarter growth at about 2.2 pct when the final count by the government is known.

Further, many forecasters see the growth rate in the final period at about the third quarter rate, or a

shade better.

Iron Age's projections put it in the camp with these many forecasters.

These forecasts of the economy, and prospects for business, don't paint a bright and cheery picture. The picture *should* be bright and cheery. After all, U.S. consumers have been spending money at a good clip, businesses have stepped up their investments and government purchases of goods and services have rolled on at a sturdy growth rate.

In the second quarter this year, the most recent period of complete data, consumer spending grew by 5.3 pct at a real annual rate. Business investment grew by about 12 pct and government purchases by almost 4 pct.

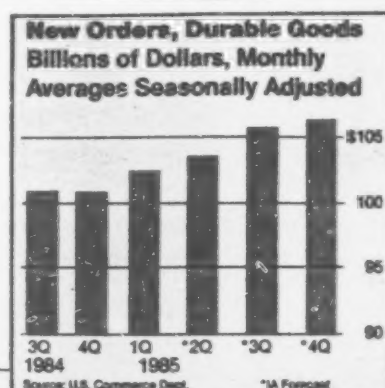
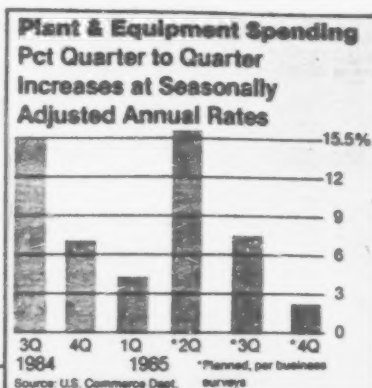
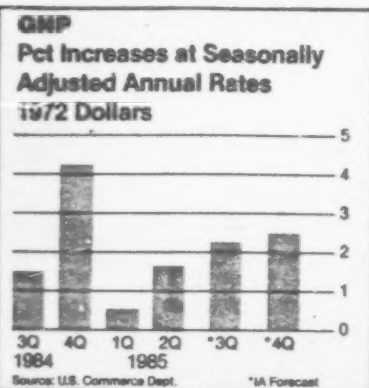
All this spending growth was not a one-quarter phenomenon. Over four quarters through the June period, these rates of growth averaged 3.7 pct, 8.1 pct and 3.8 pct, respectively.

Where's the Payoff?

These are solid growth rates. Not spectacular by any means, but solid. Certainly, spending like that in the past stirred up high levels of activity in plants, fattened corporate earnings and led to big gains in employment.

But these payoffs haven't come this time around on the recovery carousel.

Over the most recent four-quarter time span, output and operating rates of U.S. factories were on a



near-treadmill. In the June quarter this year, U.S. industry output was ahead of the year-ago rate by a scant 1.4 pct. The plant capacity usage rate in manufacturing plants was actually down by 1.6 pct.

Corporate profits? They have not responded at all to growth of outlays in the economy. In fact, through the June quarter this year, corporate earnings were trapped on a 5-quarter straight-down slide.

Factory employment? In August, factory employment was down by more than 150,000 from the year-ago level.

The failure of recent spending growth to ignite key sectors of the economy is no mystery to those U.S. industries which have been like tennis facing the imports bowling ball.

"Imports have skimmed off the cream," explained one trade expert.

Recently, analysts at the National Assn. of Manufacturers (NAM), claimed that the biggest single reason for the slowdown in the economy was the huge gap in U.S. foreign trade. These experts stated that if this country had done better in world markets, the nation's growth rate since mid-1984 would be 4.9 pct instead of the actual 2.2 pct.

Is It Too Late?

U.S. manufacturers have fought back against imports in a number of ways ranging from Washington lobby efforts for protection to restructuring of their operations. Ironically, now that they are becoming tougher world-class competitors, key domestic spending sources seem to be running out of money.

The consumer, who accounts for two out of every three dollars spent in the economy, is now running on the ragged edge. His total debt, already at an record level, is swelling at a rate twice that of his income. And he is putting less of his income into savings than ever in U.S. postwar history.

Recent huge borrowing by consumers has pushed their total financial liabilities to record highs also. These liabilities, which include installment credit as well as mortgages, bank loans and other borrow-

ing, reached 72 pct of personal income in the first quarter. And they continue to rise.

The consumer might not be so bad off if he was at least salting away a bit more of his income than in the past. However, in the first quarter, personal savings, as a percent of disposable income, ran at a 4.5 pct annual rate. That was the lowest rate in the entire postwar 1950-85 period. (The savings rate was up slightly in the June quarter).

Business Hurts, Too

Consumers then are strapped financially. And so are corporations.

Corporate net income has been falling at the same time corporate debt has been rising. After three years of recovery, corporate profits have not even returned to pre-recession levels.

Running along with the profit fall, the corporate debt-to-equity ratio of U.S. corporations has leaped ahead at a record pace. As the year opened, this ratio had soared at a record rate for any 12-month span—to 81.4 pct from 73 pct. That increase was as large as the total rise over the previous 16 years.

The other spending sector of the economy, the government, is, of course, also strapped financially. In Washington, budget deficit consciousness is overwhelming.

So, from where will come the spending that is needed to keep the current business expansion cycle on track? Consumers, corporations and the government all face severe financial problems, according to many economists using the noted traditional measures of financial health.

A Second Look

However, it may well be that the foreboding and well-publicized data may be making things look worse than they are at this time.

Take GNP data. Sure, GNP grew by only 2 pct at an annual rate in the June quarter. But real final sales (GNP less change in business inventories) grew by 4.7 pct. That, of course, is a solid growth rate.

It is a weakness of the way GNP

data is structured that decreases in inventory buildup are counted as lessening GNP growth. In reality, a small stock buildup is an economic indicator of better days ahead. It is excess stockpiling that almost invariably leads to recessions. Thus, it is hard to see how the economy is about to flash 'tilt' when final sales are expanding.

And, is the consumer really reeling? Well, the latest major quarterly surveys of consumer attitudes (The Conference Board and University of Michigan) found buying plans continuing at a high level. Consumers, it was found, are reacting very favorably to cooled price inflation and tempered interest rates.

Also, it has been found that consumers have dared to borrow and spend more because the assets they hold have continued to rise in value. These include homes, stocks and bonds. "Even if the increased assets are only on paper," said one economist, "it tends to put the consumer in the right frame of mind to give into buying impulses."

As for the decline in corporate profits, that is never good news. However, corporate cash flow has continued to grow. And it is cash flow—retained earnings and depreciation set-asides—that is the prime source of business capital investment funds. The year-to-year decline in profits through the June quarter was 9.1 pct; cash flow grew by almost 6 pct.

This probing the 'other side' of today's complex data reveals there is a continuing growth thrust in the economy. And the cream-skimmer—imports—may have peaked. After all, the dollar has been weakening since February. Too, economic growth rates of U.S. world trade partners are moving up closer to those in this country. This should take some steam out of imports as foreign manufacturers go after improved markets in their own countries.

Still, the mixed bag look of the recovery will likely continue. This is already apparent in recent record auto sales being scored even as other industries lagged. □

STEEL

With a little more volume, domestic mills could earn some money.

Steel Shipments
In Millions of Tons



Source: AISI

*IA estimate

Salomon Brothers Inc. is bullish on the steel industry.

In a dope sheet dated August 20, the investment firm recommended buying the stock of U.S. Steel, Bethlehem Steel and Inland Steel Corps.

Cited in this connection were the cost cuts of recent years: U. S. Steel lowered its labor content from 10 manhours a ton to 4 manhours a ton; the whole domestic industry was down to 6 manhours a ton.

The voluntary restraint program should start bringing steel imports down, said Salomon Brothers. From 27 pct in the first nine months of the program, said the study, the foreign share of the American steel market will drop to 18 pct in the second half of 1985.

Domestic mills were seen benefiting from the trade and cost factors. "We believe that steel companies' earnings will improve significantly in the second half over the year-earlier period," said Salomon Brothers, "and we anticipate that fourth quarter results will be the strongest of the past few years."

There is, indeed, the potential for dramatic swing in steel profits. With a little more volume, domestic mills could earn some money. And for the first time since the restraint program began, imports have taken a sharp dip. The 1.5 million tons reported for July was down from 2.3 million tons imported in June.

Alas, the encouraging import statistics haven't yet translated into more business for domestic mills. In its study, Salomon Brothers projected steel shipments of 19 million tons in the third quarter and 20 millions tons in the fourth quarter. These numbers were in line with the consensus forecast.

In early September, the market was lagging the forecast. Domestic mills shipped only 5.7 million tons in July, and no pickup was indicated

by orders for subsequent months. Shipping estimates were being revised downward to 17.5 million tons in the third quarter and to 18 million tons in the fourth quarter.

For the full year, the revisions represented the difference between the 75 million tons originally predicted and the 72 million or 73 million tons now expected. That doesn't seem much of a change, but the tons deducted are critical from a profit standpoint.

The sensitivity of steel earnings to volume was brought out when shipments rose from 18 million tons in the first quarter to 19 million tons in the second quarter. The number of major mills reporting profits jumped from 9 in the first quarter to 15 in the second quarter.

At today's prices, the industry's break-even point is somewhere around 18 million tons. The way it looked in late summer, the third quarter would be below the profit level and the fourth quarter would be just about there.

This picture could change. With lead times short, there could be a strong fourth quarter surge with no advance warning. There were, moreover, grounds for believing the July import slide was the start of a sustained downturn. Voluntary restraint agreements have been signed with 14 nations. If foreign countries are to comply with the agreements, they will have to compensate now for overages in the early portion of the quota term.

A case could be made for impending prosperity, but after four years of devastation and disappointment, no one in the domestic industry was counting on a sudden boom.

One consolation, possibly, was that steel companies will probably go into next year's labor negotiations in a financial state that should make for wage restraint.

NONFERROUS

Nonferrous metals producers are looking for a fourth quarter pickup to round off another so-so recovery year. Industrial consumption slipped seasonally in the third quarter but began picking up after the Labor Day weekend.

Metal prices were nothing to shout about during the third quarter, but suppliers generally expect modest recovery in the final months of the year. With plenty of metal around, there isn't likely to be anything like a shift to a seller's market, but there have been attempts to keep inventories in hand and this has led to expectations of some pay-off as demand picks up again.

The copper producers, who have been waiting a long time for favorable market fundamentals to assert themselves, are pricing metal a few cents a lb better than they were at the same time last year.

Barring a surge in producers' stocks beyond the midyear increase, copper prices should do a bit better in the fourth quarter.

One plus for the domestic copper companies this year has been the decline in imports of refined copper, particularly from Canada and Chile. Production rates worldwide still affect prices via the hedge markets in London and New York, but fewer imports leave U.S. companies with more of a share of the home market.

The aluminum producers still were waiting for the payoff on months of production cutting as the third quarter wound down. The spot aluminum price on the London Metal Exchange was slipping back to a weak 45¢ a lb in post-Labor Day trading. Traders were pinning the decline on expectations that current and future power incentive contracts would limit inclinations to curb output much further in the U.S.

As has been the case with copper, the import pressure on the U.S. alu-

minum industry has abated this year. In the first half, ingot imports were down 12.4 pct from the same 1984 period. On the other hand, imports of mill products, which bit off a sizable piece of the domestic market last year, were down minimally in the first half of 1985. It was a different story in the export column, with mill products down 14 pct and ingot exports up better than 89 pct. Exports of scrap were nearly double.

Industry shipments through the first half were down 3.8 pct. Industry bookings, on the other hand, continued firm and managed to pick up the tempo a bit during the third quarter as well. Orders for sheet items (except can stock) were significantly higher after midyear and orders for extruded products also were up while ingot bookings slipped. The U.S. aluminum industry managed to pare its total inventory by 6.8 pct in the first half and it came into the third quarter with primary aluminum production running 16.4 pct under the year-earlier rate.

There wasn't any post/Labor Day pickup for nickel. The London Metal Exchange spot price moved below \$2.10 a lb for the first time since late July 1984 after having been close to \$2.60 a lb during the spring. Price strength early in 1985 reflected good consumer demand, the decline in producers' stocks and, according to some sources, producer trading on the London exchange during the second quarter.

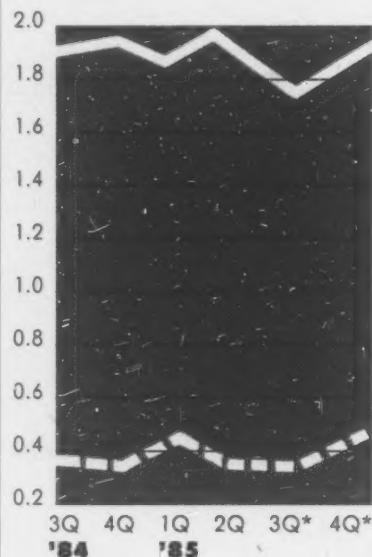
Nickel users, meanwhile, continued to fill requirements on a hand-to-mouth basis and were pressing their suppliers for concessions.

The zinc smelters racked up a 27 pct gain in shipments by midsummer. Production shutdowns helped keep the domestic portion of supply in hand and the smelters' inventories going into August were down sharply from end-1984 levels.

Nonferrous metal suppliers expect a modest recovery in prices in the fourth quarter.

Nonferrous Metals Shipments

In Millions of Short Tons



— Aluminum

— Copper

Source: American Bureau of Metal Statistics,

Aluminum Assn.

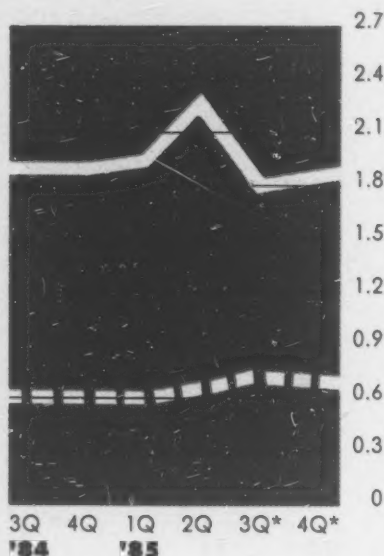
*IA estimate

AUTOMOTIVE

The automakers expect consumer confidence to remain steady in the fourth quarter.

Automotive Sales

In Millions of Units



— Domestic
- - - Imports

Source: Motor Vehicle Manufacturers Assn.

*IA estimate

U.S. automakers likely will sell 1.9 million cars in the fourth quarter, an increase of 100,000 units over the 1.8 million sold in the third quarter. Sales of imported cars reached a record of 800,000 in the third quarter but will drop off slightly to 700,000 in the fourth quarter. That's mainly because the Japanese are running into the 2.3-million-unit year-long limit of the current voluntary restraint, which expires next March 31.

Total domestic-car sales in 1985 likely will end up at 8 million units, down slightly from 1984's 8.1 million sales. The greater volume of Japanese imports this year will push up import sales for 1985 to 2.8 million units, an increase of 400,000 units over the 2.4 million imported vehicles sold in 1984.

For consumers, this is an excellent time to buy a car. Domestic automakers began low-interest financing in August and likely will continue such discounts through much of the fourth quarter—though perhaps not at the record-low 7.7 and 7.5 pct rates offered by the Big Four in August and September.

Even Nissan has joined the discount-financing rates in some states. Automakers are offering the deals because of increased competition from the greater number of Japanese cars; and because of the slowing economy.

Automakers plan to build 2 million cars in the fourth quarter, an increase of 200,000 units over the third quarter's 1.8 million-unit production.

If Detroit sells only 1.9 million units in the fourth quarter, that will mean a glut of cars in the dealer lots. That will heighten competition.

Auto executives expect the prime interest rate to hold steady at 9.5 pct through the fourth quarter. Gasoline prices will remain stable. One auto-

maker expects inflation to speed slightly, with the increase in the consumer price index accelerating from 2.3 pct in this year's first quarter to 4.5 pct in the fourth.

Given these fairly stable conditions, automakers expect consumer confidence to remain steady in the fourth quarter.

The latest report of the University of Michigan Institute for Social Research gives an optimistic picture of consumer confidence. Consumers expect slow but sustained and stable growth in the economy, said Richard Curtin, director of the institute's Survey of Consumer Attitudes.

A record number of consumers, said the survey, have favorable attitudes toward buying a car: 67 pct, slightly above the 65 pct of the second quarter 1983. Interest rates are the single most important factor in consumers' decision when to buy.

"Consumer confidence remains high after more than two years," said the survey, "the longest sustained period since the 1960s—and without the earlier 'boom-and-bust' psychology."

On the other hand, consumers already have extended themselves in their spending: Consumer debt is approaching the 1979 peak. And growth in real disposable income slowed from the 6.7 pct increase from 1983 to 1984 to 3.1 pct from 1984 to 1985. The growth from this year to next is expected to slow even more, to 2.4 pct.

"The market is getting softer," said one auto analyst. His company predicts 7.2 million domestic and 3.1 million import sales in 1986: a drop from 1985 of 800,000 units for the domestics and a gain of 700,000 units for the imports. Other automakers are more optimistic, forecasting that sales from 1985 to 1986 will drop off just slightly or even remain flat.

MACHINE TOOLS; FLUID POWER

MACHINE TOOLS—By the end of the third quarter of 1985, the outlook for the U.S. machine tool builders was cautious—cautious because machine tool orders only held steady during the first six months of 1985, rising less than 1 pct over the same period in 1984.

Total orders reported by the member companies of the National Machine Tool Builders' Association for the first six months were \$1.4 billion. Metal forming orders fell 19 pct, to \$365.2 million, while metal cutting machine orders were up 10 pct over 1984, to \$1 billion.

July orders for new machine tools were about \$200 million, down 14.6 pct from June and 35.9 pct from July 1984. Metal cutting machine orders were \$151 million, down 17.4 pct from June. Metal forming orders were \$50 million, down 4.5 pct from June.

Sales by distributors of new machine tools rose in July, according to the American Machine Tool Distributors' Association (AMTDA). Its index measures machine tool consumption and reflects demand for domestic and foreign machine tools.

The AMTDA 12-month moving average has been flat throughout 1985, with sales dipping during April, May and June, then rising in July.

Both associations expressed concern for the uncertainty induced by the proposed changes in the tax code and the future of the investment tax credit.

There is also on-going concern over the adverse effects that the Federal deficit has regarding major capital investment decisions.

All of this is negatively impacting on the U.S. machine tool industry, prompting some to view the remaining quarter of 1985 as one of cautious pessimism for sales of machine tools made in the U.S.

FLUID POWER—Forecasts for fluid power equipment orders in the fourth quarter—usually the industry's slow period—are even more cautious this year.

The second half of any year tends to be a slower period for this industry than the first six months. But fluid power sales seemed to hit a stumbling block in first quarter. The second quarter turned out to be less than expected. And as a consequence, the second half decline begins from a lower base.

Part of the decline stems from imports, which have trimmed a lot of potential from what had been a rising—or at worst, flattening—market in the second quarter.

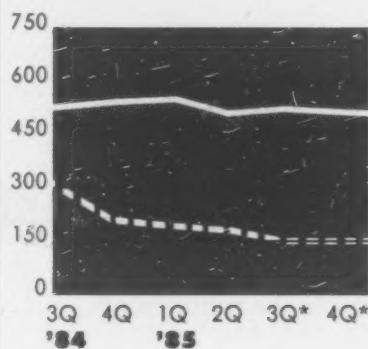
Veteran observers warn that this problem is growing. More fluid power products are entering the U.S. as components in finished goods. Off-shore fluid power producers are boosting their sales-service offices here to service these machines. The combination gives them a good base to go after more business in the domestic OEM markets.

National Fluid Power Association members reported a 3 pct decline in new orders in the second quarter, enough to take the expected \$1.5 billion new order rate down to about \$1.45 billion. Hydraulic orders slipped 6 pct from first quarter seasonal levels and offset a slightly better than average performance by the pneumatic producers.

Some industry members believe their second half orders could move sideways, rather than down. But more say the slippage will continue, even if at a slow rate. Past history is on their side. In the economic recovery that began in 1983, fluid power builders broke that pattern, scored a solid fourth quarter gain. But producers now say the 1986 outlook is cloudy enough to make that kind of movement unlikely.

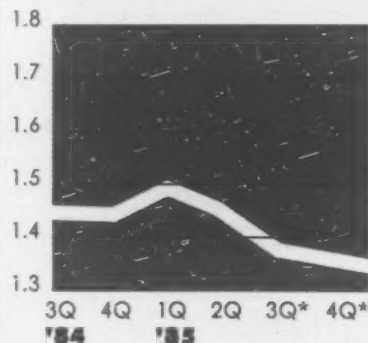
Some to view the remaining quarter as one of cautious pessimism for machine tools.

**Machine Tools
Net New Orders**
In Millions of Dollars



Source: National Machine Tool Builders Assn.
*/A estimate

Fluid Power, Shipments
In Billions of Dollars



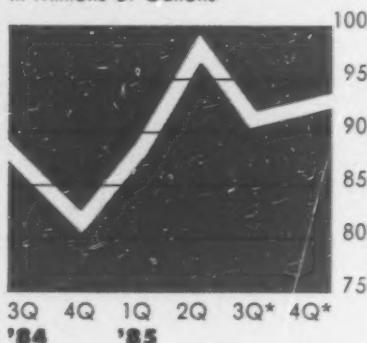
Source: U.S. Department of Commerce and NFPA
*/A estimate

COATINGS; PLASTICS

One key reason for the strength in industrial coatings is the production schedules of the automakers.

Industrial Coatings Shipments

In Millions of Gallons

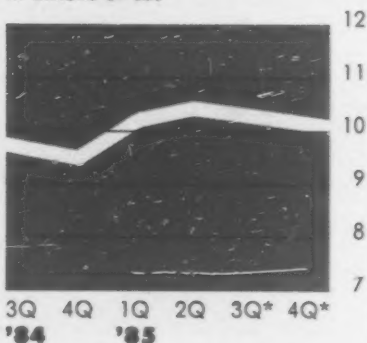


Source: U.S. Department of Commerce

*1A estimate

Plastic Resins Sales & Captive Use

In Billions of Lbs



Source: SPI Committee on Resin Statistics as compiled by Ernest & Whinney

*1A estimate

COATINGS—Industrial coaters likely will ship 93 million gallons of product in the fourth quarter. That's a slight increase from the 91 million gallons estimated for the third quarter this year—but a big jump from the 81 million gallons shipped in last year's fourth quarter.

One key reason for the strength in industrial coatings is the production schedules of the automakers. Detroit will build 2.0 million vehicles in the fourth quarter, an increase of 200,000 over the third quarter's 1.8 million vehicles. The OEM auto market is the coaters' largest single market. Truck production has increased by 15 pct in 1985 over 1984.

Other bright spots for the coaters are coil coatings and metal buildings.

"The market for coil is stronger than ever in the third quarter and should continue that way in the fourth quarter," said an executive at one coatings company. "Metal buildings are proving a strong market for coil coatings and should pick up further in the fourth quarter."

The markets in the furniture, farm-equipment, and off-road industries have been weak for much of this year. They could pick up somewhat in the fourth quarter.

The number of gallons shipped is decreasing as (1) coaters use higher-solid products; (2) more of the coating adheres to the surface of the end-users' products; and (3) coaters ship more powder coatings, which are extruded dry onto the end-users' products.

On the other hand, automakers rapidly are changing their paint systems to base coat/clear coat technologies—which increase the number of gallons per vehicle. Chrysler has converted all its plants to the new technology; GM and Ford, about half their plants.

PLASTICS—If orders keep coming in as they have during the first half of 1985, the plastics industry will finally crack the 40 billion lb barrier. At mid-point, sales had reached 20.6 billion lbs, compared to 19.8 billion lbs at the same time last year.

The second quarter got off to a good start with a 3.5 pct increase over the first quarter.

Not all the figures were in, but it is estimated that plastics sales in the third quarter dropped a slight 1.7 pct and it is likely that sales could slip an additional 2.9 pct in the fourth quarter.

Then, there are the plastics, the ones which are out to replace metals. These include certain thermoplastics and thermosets.

The most notable drop here is with epoxy resins, which are down 6 pct from last year. The use of epoxies in composites for the aerospace industry is going along very well, but the materials took an overall nose-dive due to the unexpected downturn in electronics.

The claim is made that only about 3 pct of the volume or 5 pct of the dollars in plastics goes toward the metal-replacing materials. The strong ones, in terms of engineering resins, are polycarbonate, thermoplastic polyester and nylon.

According to the statistics available from the Society of the Plastics Industry, nylons are up 2.2 pct over last year and thermoplastic polyesters are up a whopping 14.1 pct.

The latter figure is misleading, however, because it includes bottle sales.

In general, engineering plastics are doing well because of the strength in automotive, while the epoxies have been hit hard by the collapse of the personal computer market plus the considerable amount of out-sourcing by the domestic electronics manufacturers.

COMPUTERS; INSTRUMENTS & CONTROLS

COMPUTERS—The computer industry, if not in a slump, is experiencing what could charitably be called a pause.

This pause has carried through most of 1985 and resulted in dozens of firms announcing layoffs. Industry growth has slid from 20 pct in 1984 to less than half that amount. Much of that slippage can be traced to a fall-off in demand for personal workstations.

Final third quarter figures are not yet available, but there is optimism that they will be up. The fourth quarter should show even greater improvement.

For the most part, this pause will be temporary. Right now, companies, faced with eroding profits, are pausing to reassess their computer needs. Many are discovering that their most pressing needs are not more computers but computers that work more closely together. In particular, firms are looking for the ability to network computers; that is, allow various computers to share information among themselves.

Firms are also waiting for a new generation of computers that will give them more for their money. Some of these new computers, like the IBM PC AT are available but in short supply. Others, like IBM's new Sierra series mainframes are not yet available; while still others exist only as rumors, like the mythical IBM PC2.

Tight budgets and disinterest in current technology are temporary obstacles to growth, but the overabundance of computer equipment suppliers and the rapid growth of the foreign content in computers will have more lasting effects on the industry. A deluge of semiconductors (computer chips), for example, both from U.S. companies and abroad has resulted in layoffs by U.S. semiconductor manufacturers.

INSTRUMENTS & CONTROLS

Third quarter sales of instruments and controls were estimated to be at a lower level than predicted earlier in the year, following a flat trend experienced by some industries during the third quarter.

The outlook for the fourth quarter and first half of 1986 is for more of the same. There are no big projects to give added impetus to sales and few incentives that would get large firms to introduce major plant-wide modernization programs.

One tipoff of the competitive morass the industry finds itself in is the higher level of interest that large suppliers of instruments and controls have shown in the lower end of the business. Firms are searching for larger shares of a market that is not expanding at this time.

Another indicator of how the industry is faring at this time is plant utilization. One marketing expert said that until production increases to the point where the factory utilization rate achieves 90 pct or better, the market will stay flat.

As with most things, the situation is neither black nor white. Metalworking manufacturing is undergoing a major change and is heading toward the unmanned factory of the future. That means increasing needs for greater process control equipment and instrumentation.

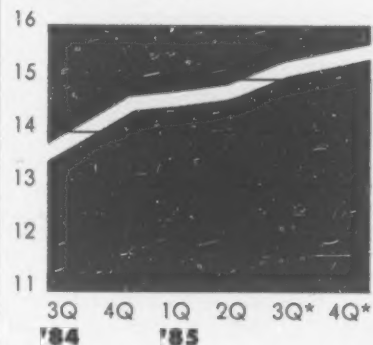
The cauldron is beginning to boil after a decade of warming up, so while the utilization factor may be important it could still be disqualified as a predictor of future events and trends. World competition does not necessarily travel in the same cycles. It could force change, particularly in the controls and instrumentation markets.

Despite a predicted annual increase of 13 pct for 1985 over 1984, this market will decline during the fourth quarter.

Computer industry growth has slid from 20 pct in 1984 to less than half that amount.

Computers Shipments

In Billions of Dollars

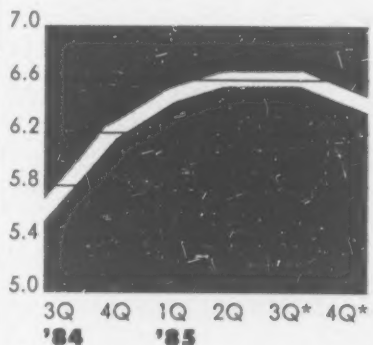


Source: U.S. Department of Commerce

*1A estimate

Instruments & Controls Shipments

In Billions of Dollars



Source: U.S. Department of Commerce

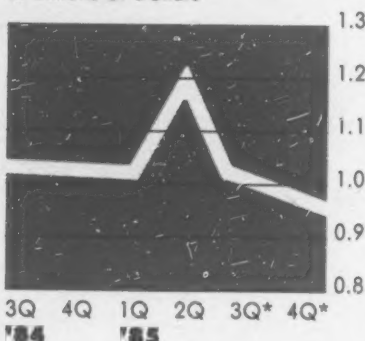
*1A estimate

CONSTRUCTION; FARM EQUIPMENT

The housing market aided the sales of lighter construction equipment.

Construction Equipment Shipments

In Billions of Dollars



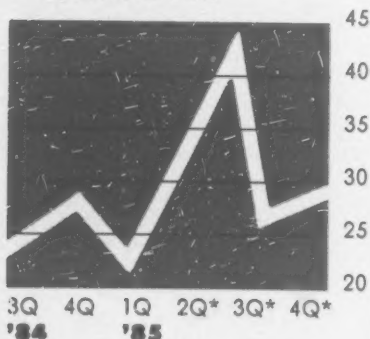
Source: U.S. Department of Commerce

*IA estimate

Note: Figures for 1985 do not reflect Commerce Dept. additions to its list of selected products. IA estimates are projected on previous year's basis.

Farm Equipment Wheeled Tractor Sales

In Thousands of Units



Source: Farm & Industrial Equipment Institute

*IA estimate

CONSTRUCTION—Construction activity held up well in 1985, and construction equipment builders expect to hold those gains for the remainder of 1985.

Seasonal factors will cut into the quarterly performance in both the third and fourth quarters. That is reinforced by some builder opinion that 1986 could see a slowdown.

Caterpillar Tractor Co., the largest U.S. producer, moved into the profit column in the second quarter despite a sales level slightly under the same period of 1984. American Hoist & Derrick also returned to the black and scored a substantial sales gain over the year ago period.

One major equipment maker has expressed a belief that second half sales will continue to show gains, a feeling that's not shared by a number of other industry sources. Equipment dealers, however, have predicted a 10 pct gain for retail sales this year.

Dealers scored a strong sales gain in 1984, which resulted in some over stocking that may have cut into the equipment builders' late 1984 and early 1985 sales. But all now agree that the overage has been whipped into line.

A surge in March sales held through April. During the summer months, however, sales were leveling. Light equipment had posted better sales gains than heavy equipment. Also, highway construction equipment, which had been a pacesetter in last year's recovery, appeared to be no more than holding its own. The housing market aided the lighter equipment sales.

The industry also scored its gains on a substantially reduced manufacturing base. There have been a lot of plant closures since 1982. The domestic industry has also faced an import surge—up 120 pct last year—which has continued to hit prices.

FARM EQUIPMENT—Despite the rebound in the second quarter, farm equipment gets a lot of question marks for the second half.

Retailers—where bankruptcies and sellouts have been rife for two years—sound more hopeful than equipment builders. The dealers point to record crops in important crops like corn, and a cleanout of dealer inventories that carried through the third quarter. Supplies of used equipment also have been reduced.

But the farm machine producers aren't as bright-eyed. Their reasons:

—The strong second quarter tractor sales were concentrated in the lower horsepower tractors where imports take a bigger bite of the U.S. market, and

—Heavy equipment sales had to be helped along by another wave of price cuts.

Deere & Co., the biggest U.S. equipment builder, reported a \$39.5 million loss on manufacturing and marketing operations during its third fiscal quarter (ending July 31). Its production was down 7 pct.

Across the border, Massey Ferguson showed some of the second quarter gains, but has continued to reduce inventories.

Specialty farming, or light construction equipment, was the bright area in the first half and accounted for the gains in the under-100 hp tractors. Big ticket items like combines (off 30 pct in the first half), and four-wheel-drive tractors (off 44.3 pct) didn't share in the second quarter recovery. Some other implements picked up briefly, then fell back again.

It's possible that concern over declining tax benefits next year could pep up late fourth quarter equipment sales. But if that's true, equipment producers aren't raising their output on that hope.

APPLIANCES; MATERIAL HANDLING

APPLIANCES—Industry analysts are predicting a mild decline in appliance shipments during the last quarter of 1985, despite the fact that the industry has established two industry records: It shipped more than 11.5 million units in the second quarter and more than 21.7 million units in the first half.

According to the Association of Home Appliance Manufacturers, second quarter shipments were 8.2 pct higher than the comparable 1984 period and year-to-date shipments were up 7.2 pct over a like period in 1984.

Industry analysts have been predicting that 40.4 million units will be bought during 1985, which would be 1 million units higher than the record set in 1984. They predict a 41.6 million unit year.

Monthly shipments of microwave ovens, refrigerators, automatic washers, and disposers were the highest ever for June. Dishwashers, dryers, electric ranges, and freezers were at the second highest level ever for June.

Contributing to the strong sales of appliances is the continuing replacement demand and new residential construction, which has been on an upward trend for the past two and one-half years. Consumer confidence remains high with rising incomes, stable employment, and low inflation. Rising consumer debt is causing many to pause in extrapolating midyear enthusiasm to last-quarter sales.

Room air cleaners may be the next appliance to gain strong marketing support. The AHAM announced that certification seals, which identify for the consumer the clean air delivery rates for dust, pollen and tobacco smoke particles, began appearing on room air cleaners in August. Ten companies are participating in the program.

MATERIAL HANDLING—An upbeat note, echoing through the material handling industry at the end of the first half, seems destined to last through the rest of 1985 and into the first half of 1986.

"The last quarter of 1985 promises to be the best quarter of this year," said one material handling executive, typifying industry optimism. Still, he confessed that up to this point in 1985 his business had been flatter. Some sizable proposals in August could jack up his company's sales by 20 pct in the second half compared to the first.

Likewise, another industry executive foresees a 12 to 14 pct orders rise for the rest of this year, but he expressed concern about next year's prospects, in the wake of U.S. Commerce Dept. reports about a downward revision in 1986 capital expenditures. A sluggish 1986 does not bode well for material handling equipment sales, which are dependent on long-term industrial growth.

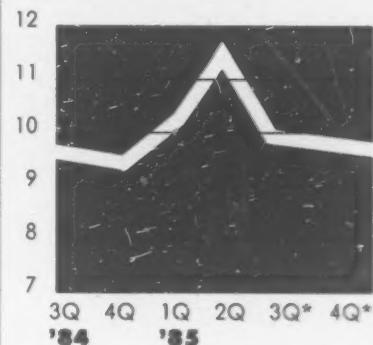
The latest report from the Material Handling Institute showed both bookings and shipments "approaching the previous high levels of 1981." Cumulative bookings for 1985 rose more than 20 pct compared to 1984, while shipments increased some 15.3 pct.

Where's the most momentum? The auto and defense industries reportedly are the most active markets, as well as the food and beverage industries. And, thanks to the weaker dollar, some larger AS/R systems (automatic storage/retrieval) manufacturers have gotten more foreign orders.

Despite all this ebullience, this industry continues to have its darker side. Smaller companies are continuing to feel the pinch from skimpier profit margins and Japanese imports continue to batter domestic lift truck makers.

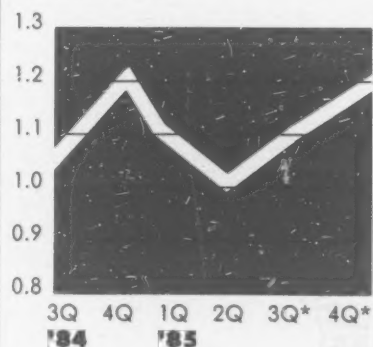
Year-to-date shipments of appliances are up 7.2 pct over the same period in 1984.

Appliances, Shipments
In Millions of Units



Source: Assn. of Home Appliance Manufacturers
*1A estimate

Material Handling Shipments
In Billions of Dollars



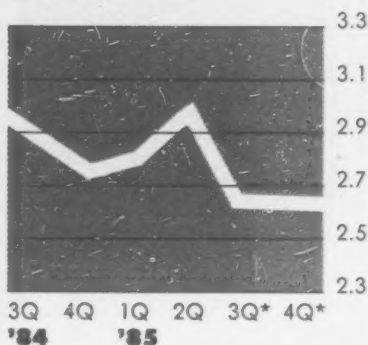
Source: Material Handling Institute
*1A estimate

CASTINGS; FORGINGS

Defense and construction continue to be solid markets for castings.

Ferrous Castings Shipments

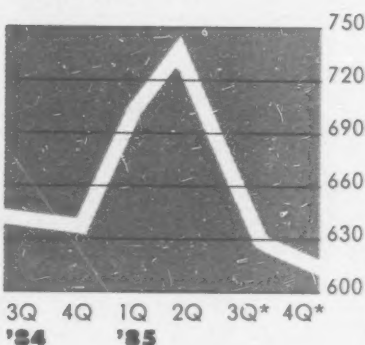
In Millions of Tons



Source: U.S. Department of Commerce
*1A estimate

Impression Die Forgings Shipments

In Billions of Dollars



Source: U.S. Department of Commerce
*1A estimate

CASTINGS—The foundry industry is cautious about the fourth quarter. Auto has held up well and construction has helped, but the truck castings demand began to fade in the second quarter of this year.

With continued low production in farm equipment and construction machinery markets (even though construction machinery has been up this year), and some of the capital goods machinery markets showing a slow recovery pace, forecasts have been cautious. And long-range viewers are even more careful when they look at prospects for 1986.

What could have been a continued recovery this year has been hurt by imports, which have been hitting margins for foundrymen.

Despite concern over imports and unhappiness over castings prices, there are new equipment programs at several foundries who are building for the long haul and to meet import competition.

Defense and construction continue to be solid markets, both in ferrous and non-ferrous castings demand. But other markets aren't showing the strength of 1984.

At least through the first half of 1985, steel castings volume and ductile castings volume were steady workhorses. Gray iron and malleable showed a strong surge coming into 1985, but seemed to be a lot more volatile as the year advanced. That may account for some of the caution about the outlook for the closing months of 1985. Gray iron is still the hands-down volume leader in the ferrous foundry market, with tonnages per month about triple that of ductile iron shipments.

One explanation for the gains in July, usually ranked with December as the industry's slowest month, is that just-in-time delivery requirements have thrown some August business back into July.

FORGINGS—Forging shipments through the third quarter are running neck and neck with last year's totals, but forging sales overall continue to drift downward.

Midway through the third quarter sales were reported down 20 pct from a year ago, and 1984 was no banner year. There is little evidence that sales will pick up in the fourth quarter. One industry member believes orders for the final months of 1985 "will be flat at best."

The now-waning economic recovery seems to have bypassed the forging industry. Most of the industries that in the past were heavy buyers of forgings remain depressed—commercial aircraft, farm equipment, construction equipment, and oil field goods, for example.

The one bright spot for forging companies has been the strong demand from the automobile companies, and even this market may not last much longer. Auto sales, predicted to be strong through the fourth quarter, are expected to sag next year as consumer spending tails off. According to one analyst, car sales could be down as much as 10 pct in 1986.

The biggest forging purchaser, the aerospace industry, has been depressed and is not expected to pick up next year. However, companies supplying forgings under military contracts have not complained about a lack of business. But how the military will spend in 1986 is difficult to predict.

What makes the forging picture even more gloomy is the suspected growth of imports into the U.S. A major study is now looking at the extent of foreign forging infiltration. That study will be completed perhaps by mid-1986. But preliminary indications are that some 50 pct of forgings now purchased in this country are coming from overseas.

AIRCRAFT; ENGINES & TURBINES

AIRCRAFT—The strong recovery in the aircraft industry firmly established itself in the middle of the year, and there is every indication that the fourth quarter will begin and end on a similar, positive note.

The strong performance in this sector is being carried by a number of factors. Airline traffic has been growing steadily and passenger loads are increasing. Worldwide airline traffic has increased between 8 and 9 pct throughout 1985. This pattern should continue, and possibly improve, in the fourth quarter.

U.S. travel has been particularly strong, with growth rates of about 12 pct. This growth has absorbed most of the excess capacity that plagued the commercial jet market during the past few years. World airline profits, which evaporated between 1980 and 1983, reached \$1 billion in 1984 and are expected to match that figure this year.

This has set the stage for many airlines to begin placing large orders for new technology replacement aircraft, making the short-term outlook favorable though competitive. For example, Airbus Industrie, the European manufacturing consortium, midway through the third quarter matched its firm order total for all of 1984. Significantly, 40 pct of the orders received this year have been for the A-320, a new airplane that will not be certified or delivered until much later in the decade.

Boeing is reporting demand that is running slightly ahead of last year for such popular mid-range aircraft as the 737. Similarly, Douglas Aircraft has been selling primarily MD-80 airplanes.

Both the small regional carriers as well as the large intercontinental airlines have been placing orders for new planes. The brunt of new orders have been received from overseas carriers.

ENGINES & TURBINES—The engine makers, while demonstrating some improvement from pre-recessionary levels, have been plagued by uncertainties through most of 1985. There is little indication that this trend will reverse itself. The positive trends that asserted themselves earlier in the year likely will lose momentum by year's end.

The automotive sector rebounded strongly for a time. But production rates probably won't be sustained. Domestic automakers have been moved to offer highly competitive financing to entice purchasers. Another major uncertainty is the number of autos Japanese manufacturers will sell in the fourth quarter. The import share of the market likely will grow over last year, dragging down demand for domestic engines.

Similar cautionary soundings have taken root in the construction industry, where a host of new Federal tax revisions and a tightening up of lending practices have caused new construction to drag. Lower interest rates have helped counteract this, but the debate over the Federal deficit has caused further concern. Any rise of interest rates in the fourth quarter would further depress this segment of the industry.

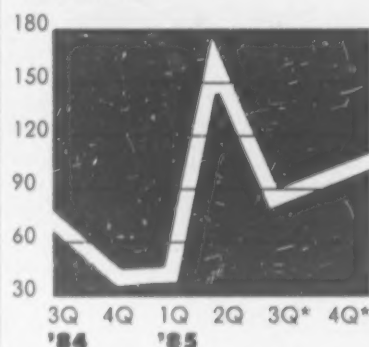
But the major drag in this market is the continuing overcapacity in the consumer electrical power market. There has been less indication this year that utilities are scaling back earlier plans. But overcapacity still exists, and it likely will throughout the fourth quarter. The domestic nuclear industry remains troubled, and manufacturers are increasingly turning to potential overseas markets.

Continuing drops in world oil prices have caused the oil segment to remain quiet. Expensive purchases of diesel engines and power plants have been rare and will likely be forestalled for several months.

Many airlines are beginning to place large orders for new-technology aircraft.

Commercial Airplane Orders

No. of Planes

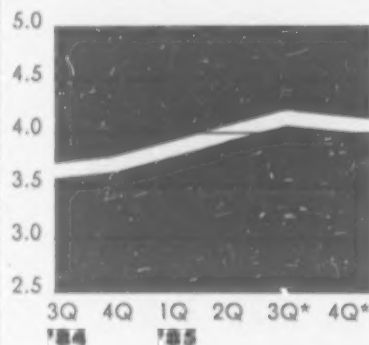


Source: Airbus Industrie, Boeing and McDonnell-Douglas

*IA estimate

Engines and Turbines Shipments

In Billions of Dollars



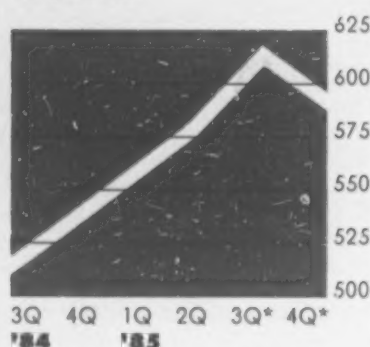
Source: U.S. Department of Commerce

*IA estimate

WELDING; HEAT TREATMENT

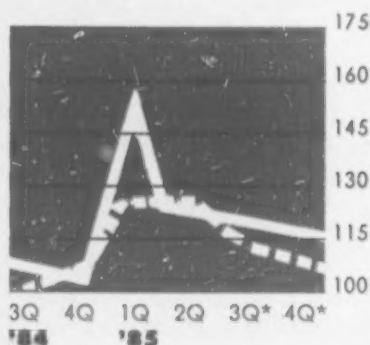
Welding distributors' sales are expected to slip in the fourth quarter.

Welding Shipments



Index: 100 = \$200 million in distributor sales
Source: National Welding Supply Assn.
*IA estimate

Heat Treatment
In Millions of Dollars



— Sales of Commercial Heat Treaters
- - - Heat Processing Equipment Orders
Source: Industrial Heating Equipment Assn., Metal Treating Institute
*IA estimate

WELDING—"The welding economy is sound," said one executive with a welding manufacturer. "We are not enthusiastic over the activity, but we're comfortable with it."

This is a remarkable statement because most of the large user industries that are dependent upon welding are not doing so well. This is particularly true with the larger companies within those industries. One explanation is that many new, small companies have been formed and they are taking up the slack.

The auto industry is fairly strong. Building construction is steady. And, naval shipbuilding is showing strength.

Unfortunately, one of welding's biggest markets, off-highway construction equipment, is but a shadow of its former self. Altogether, there has been marginal improvement, but it would have to be measured in fractions of a percent.

News from the distributor end of the business is much brighter.

Based on statistics compiled by the National Welding Supply Association (NWSA), Philadelphia, business was booming earlier this year. The second quarter rebounded with a 7.5 pct gain over the first quarter. The third quarter saw a 3 pct drop in business.

Bear in mind, however, that the second quarter was the strongest ever since the NWSA began tabulating statistics way back in 1981.

The fourth quarter is expected to slip by another 1.5 pct.

The government, on the other hand, sees welding having another \$3 billion year, but that business is running 2.5 pct behind 1984.

Both the government and the NWSA include imports in their figures. Last year, the government said, imports constituted 9 pct of the total welding consumption in this country and could increase in 1985.

HEAT TREATMENT—Bolstered by a solid July, heat treaters are looking to a straight run through both the third and fourth quarters.

The rate of gain can't be sustained, naturally, but it's been pretty good in 1985. There may have been moments of doubt back in the second quarter, when a tremor hit some shop order books, but it should be noted that a few heat-treaters reported strong July bookings. In a couple of cases, the shops in question hit record months.

But when the smoke cleared, it had translated into a pretty good July, confirmed by the Metal Treating Institute when its membership poll indicated a 6 pct gain over the 1984 July period. Talk with a few heat treaters and you'll probably get reports that August was a disappointment. But even these shops are willing to bet they'll have a solid level of activity until December.

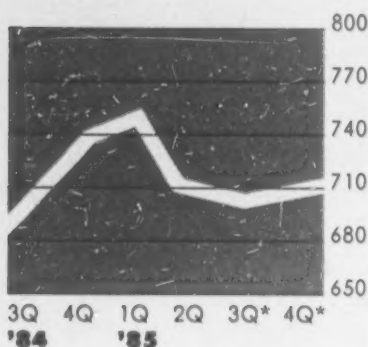
Some are crediting their current strength to new business that has become possible as they boosted their own purchases of industrial heating equipment. Tracking the rising heat treat billings, sales of industrial heating equipment hit an impressive \$123.7 million in the first quarter. There's usually some lag between a rise in heat treat billings, and the rise of new equipment purchases by the heat treat shops. But in 1984, equipment came back at a faster rate than the gains in heat treat billings.

The belated arrival of some capital goods heat treat business during the summer was another factor offsetting the continued lag in mobile equipment markets. Defense suppliers say that that has held steadily through much of the two year period. Demand from consumer-related and construction industries was solid through the period, though some areas of the automotive market began to soften in the second quarter.

FASTENERS; GEARS

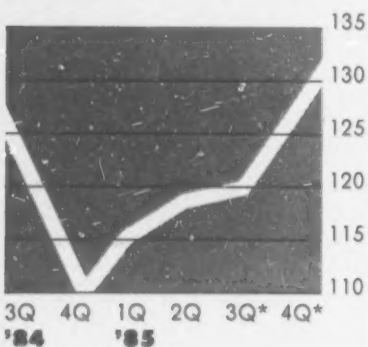
Demand for specialty fasteners has held up well this year.

Fasteners, Sales
In Millions of Dollars



Source: Industrial Fasteners Institute
*1A estimate

Gears Bookings



Based on average monthly bookings, 1977 = 100
Source: American Gear Manufacturers Assn.
*1A estimate

FASTENERS—The first three quarters of 1985 have been tough ones for the producers of standard fasteners because of foreign competition.

Demand for specialty fasteners, on the other hand, has held up well this year. Orders reportedly are ahead of last year pace.

Sales this year started off with a bang, but that fast start has slowed in the second and third quarter. Some pickup should come in the last three months. The second half has seen a cooling in the economy, so fastener manufacturers expect to see business down about 10 pct from first half figures.

The automotive industry, a strong buyer of fasteners this year, should remain strong through the fourth quarter, with auto sales up slightly from the third quarter. Car sales, however, are projected to be off 10 pct next year as consumer spending drops off. This year consumers have borrowed at unprecedented rates, however this borrowing, say economists, cannot be sustained much longer.

Special fastener producers are benefitting this year from military orders. Several producers see this holding up through next year. Orders from commercial aircraft firms, however, have been poor.

Sales through the fourth quarter are expected to continue pretty much at the same volumes of quarter number three, which in turn was much like the second quarter. "I don't see any surprises for the rest of this year," said one manufacturer, "but expect business to drift lower after the new year as the U.S. economy continues to slow."

Next year could be even more depressing for general fastener producers, for foreign products are expected to continue to make major inroads into the U.S. fastener market.

GEARS—Flat as the Kansas farmlands is the way one Midwestern gear executive describes the current quarter, although he's sure he paints a more optimistic picture than some of his colleagues.

"I see a little bit of growth in late 1985 coupled with a bit more in early 1986, then ...who knows?"

Traditionally, the gear business slows down in the second half compared to the first, and this year should be no exception. However, while some gear industry observers in June were looking for fourth quarter sales to rise 6 pct over those of the third quarter, some are revising this downward.

According to the latest American Gear Manufacturers Assn. report, the composite gear bookings index declined 12.5 pct at mid-year with lower bookings registered in six of the eight product groups. But the composite shipments index rose 10.9 pct, an increase of 2.9 pct over the same period a year ago.

One gear official said that demand for big gears is still off, but orders for precision and commercial-type gears should continue to hang in there, buttressed by continuing strength among automotive, aerospace, appliance, computer and paper industry markets.

But lagging demand continues among capital goods markets, such as oil, chemicals and mining, and this will probably carry into the beginning of next year.

Gear business from the farm equipment sector is still dismal, and sales to construction equipment makers is described as "soft."

Gearmakers are still plagued by imports and see no relief in sight. "This is a serious situation for us," said one industry spokesman. Imports are overtaking not only the domestic OEM market, he explained, but the replacement market as well.

SHIPBUILDING; RAIL CARS

SHIPBUILDING—It's that time of a year again when it's difficult to estimate Naval ship production. The question is this: How many ships out of the FY86 budget will be in the yards' fabricating hands before the end of the year?

In this estimate (see chart), the prediction appears to be grim—only 76 ships under construction during the fourth quarter.

If Congress acts in time, however, there's a possibility that construction will start on 23 more before the first of the year; thus, that measly 76 figure could jump to a healthy 99. Our prediction is that it will be closer to 76.

Also in the FY86 budget will be another Trident submarine which will be worth more than \$1.2 billion to its builder, General Dynamics Corp. That should keep employment up in the Groton area.

Domestic shipyards are currently working away on a FY85 appropriation of \$11.5 billion. The 1986 budget request is for a \$11.4 billion package.

In commercial shipbuilding, there doesn't seem to be any new construction to replace those ships that have been launched. Indications for the future are that commercial shipbuilding will not get any better. If anything, it will get worse, to the point where it might even dry up in another year or two.

If there are any rays of hope, it will have to be in drill rig construction, but any substantial recovery there could be many months away.

Summing up, Naval construction was off in the third quarter by close to 10 pct. It could go down by another 7 pct in the fourth quarter, although a 4 pct drop is more realistic. Of course, these percentage figures are based on the number of ships, and one mine sweeper does not equal one nuclear submarine.

RAIL CARS—This is not a good year for rail cars.

Orders in the second quarter dipped about a 13 pct dip from the first quarter. Meanwhile, industry members expect the third quarter will see orders rebound about 6 pct when all the figures are in. The fourth quarter likely will fall back to the level of the second quarter.

One reason for all of this pessimism is inquiries are down. What production there is has been mostly coal cars for the utilities and some inter-modal flat cars for leasing. In good times, the railroads themselves were buyers of coal cars.

Orders for new freight cars in July totaled 1,090, compared with 827 in June and 607 in July a year ago, according to the Association of American Railroads and the American Railway Car Institute. Cumulative orders for the first seven months of this year came to 5,932, compared with 11,046 at the same time a year ago.

Deliveries of new freight cars in July totaled 1,075, compared with 1,077 in June and 1,327 in July 1984. Cumulative deliveries for the first seven months of 1985 totaled 7,018, compared with 6,315 for the same period last year.

As of August 1, the backlog of cars on order but undelivered was 3,858, compared with 3,843 on July 1, and 6,821 on Aug. 1, 1984.

Meanwhile, 38 locomotives were placed in service in July, compared with 28 in June and 93 in July 1984.

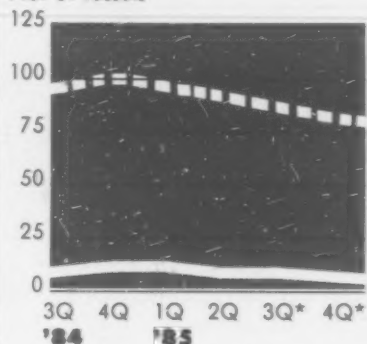
As of August 1, the backlog of locomotives on order but undelivered totaled 274, compared with 267 on July 1, and 159 on Aug. 1, 1984.

Taking retirements into account, the fleet of owned and leased diesel-electric locomotives was 22,799 on August 1, compared with 23,043 on July 1, and 24,857 on August 1 a year ago.

A 4 pct drop in naval shipbuilding is likely in the fourth quarter.

Shipbuilding

No. of vessels



Commercial, 1,000 gross tons or over

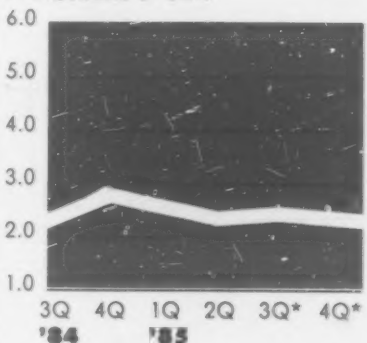
Naval, 1,000 light displacement tons

Source: Shipbuilders Council of America

*IA estimate

Rail Car Orders

In Thousands of Units



Source: American Railway Car Institute

*IA estimate

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective September 9, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	182	171	173	181
Pittsburgh	149	154	167	187
Youngstown	91	98	93	73
Lake Erie	113	130	120	160
Detroit	147	140	135	143
Chicago	491	484	466	355
Cincinnati	90	94	87	89
St. Louis	72	71	60	50
Southern	182	187	206	161
Western	74	71	84	74
U.S. Production	1,591	1,600	1,591	1,473

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 80.50-26.9*
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53**

*80.50¢—Pickands Mather as of 1/27/81.

86.9¢—U.S. Steel as of 3/15/82. Cleveland-Cliffs as of 2/26/82. Oglebay Norton as of 3/25/82. and Hanna Mining as of 2/26/82.

**Effective 8/1/83.

NONFERROUS PRICES

(Effective September 9, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	45.42	46.09	9/9/85
Copper (C)	66.00-67.00	66.50-67.00	9/9/85
Lead	19.00-20.00	19.50-20.00	9/9/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	213.87	219.00	9/9/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	41.00	41.00-47.00	8/19/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$236.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$197.00
Cadmium, ton lots	\$1,000-1,250
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per tray oz.	\$319.60
Indium, dollars per tray oz.	\$2.50
Iridium, dollars per tray oz.	\$430.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$320.00-330.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

Nickel electro (PDCR)	\$3.29
Palladium, per tray oz.	\$95.00
Platinum, per tray oz.	\$309.50
Rhodium, per tray oz.	\$920.00
Silver ingots, per tray oz.	\$6.10
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Sept. 2—5¢ 1.67	Sept. 5—Holiday
Sept. 3—555.81	Sept. 6—550.49
Sept. 4—555.85	

Scrap Prices

Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	59	48 1/2
Yellow brass	52 1/2	43 1/2
Red brass	55 3/8	45 1/2
Comm. bronze	56 1/2	46
Mang. bronze	45 1/4	44 1/4
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	55
No. 2 copper wire	47
Light copper	38

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	51
No. 2 copper wire	43
Light copper	34
No. 1 composition	46
No. 1 comp. turnings	44
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	30
Radiators	35

STEEL PRODUCTION, COMPOSITE PRICES

(Effective September 9, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,591	1,600	60,779	66,868
Capacity Utilization Rate	62.4	62.8	66.2	72.1

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (¢/lb.—eff. 7/1/84)	27.582	27.582	27.582	27.582
Pig Iron** (Net ton= 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton=2240 lbs.)	\$72.83	\$73.50	\$74.17	\$85.17
No. 2 bundles	\$53.17	\$53.17	\$53.83	\$52.17

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$75.50	\$75.50	\$77.50	\$92.50
No. 1 steel, Philadelphia	70.50	72.50	72.50	81.50
No. 1 steel, Chicago	72.50	72.50	72.50	81.50
No. 1 bundles, Detroit	69.50	69.50	69.50	77.50
Low Phos., Youngstown	70.50	70.50	70.50	80.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	71.50
No. 1 mach'y cast., Phila	92.50	93.50	93.50	98.50
No. 1 mach'y cast., Chi	99.50	99.50	99.50	115.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing plants within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Aluminum

New mixed clips	33	— 34
Old sheet	30	— 31
Old cast	30	— 31
Clean dry borings	31	— 32

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	24	— 26
Mixed L.C. clips	21	— 22
Old sheets and cast	20	— 21
Borings and turnings	16	— 18
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 39
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	6	— 8
Whale batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	120	— 130
Nickel rod ends	120	— 130
Nickel sheets, clips	120	— 130
Nickel turnings	35	— 45

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

EFFECTIVE SEPTEMBER 9, 1985

(Effective September 9, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 75.00 to	\$ 76.00
No. 2 hvy. melting	65.00 to	66.00
No. 1 dealer bundles	90.00 to	91.00
No. 1 factory bundles (auto)	90.00 to	91.00
No. 2 bundles	54.00 to	55.00
No. 1 busheling	89.00 to	90.00
Machine shop turnings	7.00 to	8.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	38.00 to	39.00
Low phos. punchings plate	92.00 to	93.00
Heavy turnings	65.00 to	66.00
No. 1 RR hvy. melting	81.00 to	82.00
Rails, 2 ft. and under	96.00 to	97.00
Scrap rails, random lgh	85.00 to	86.00
RR specialties	95.00 to	96.00
No. 1 machinery cast	71.00 to	72.00
Cupola cast	64.00 to	65.00
Heavy breakable cast	30.00 to	31.00
Stainless		
18-8 bundles and solids	615.00 to	625.00
18-8 turnings	515.00 to	525.00

Chicago

No. 1 hvy. melting	\$ 72.00 to	\$ 73.00
No. 2 hvy. melting	67.00 to	68.00
No. 1 dealer bundles	88.00 to	89.00
No. 1 factory bundles (auto)	86.00 to	87.00
No. 2 dealer bundles	61.00 to	62.00
No. 1 busheling	84.00 to	85.00
Shredder scrap	84.00 to	85.00
Machine shop turnings	42.00 to	43.00
Mixed borings and turnings	44.00 to	45.00
Shoveling turnings	46.00 to	47.00
Cast iron borings	45.00 to	46.00
Low phos. large scrap	96.00 to	97.00
Low phos. punchings plate		
1/4 in. and heavier	112.00 to	113.00
Low phos. 2 ft. and under	107.00 to	108.00
No. 1 RR hvy. melting	76.00 to	77.00
Scrap rails random lgh	82.00 to	83.00
Recoiler rails	107.00 to	108.00
Rails, 2 ft. and under	105.00 to	106.00
RR couplers and knuckles	94.00 to	95.00
RR car axles	111.00 to	112.00
No. 1 machinery cast	99.00 to	100.00
Cupola cast	92.00 to	93.00
Stave plate	89.00 to	90.00
Steel car wheels	89.00 to	90.00
Stainless		
18-8 bundles and solids	560.00 to	570.00
18-8 turnings	475.00 to	485.00
430 bundles and solids	150.00 to	155.00
430 turnings	120.00 to	125.00

Philadelphia

No. 1 hvy. melting	\$ 69.00 to	\$ 72.00
No. 2 hvy. melting	60.00 to	63.00
No. 1 dealer bundles	85.00 to	88.00
No. 2 dealer bundles	42.00 to	45.00
No. 1 busheling	82.00 to	85.00
Shredder scrap	85.00 to	88.00
Machine shop turnings	25.00 to	28.00
Mixed borings and turnings	25.00 to	28.00
Shoveling turnings	40.00 to	43.00
Low phos. 5 ft. and under	80.00 to	83.00
Low phos. 2 ft. punchings	99.00 to	102.00
Electric furnace bundles	89.00 to	92.00
RR specialties	80.00 to	83.00
Rails, 2 ft. and under	102.00 to	105.00
Cupola cast	76.00 to	79.00
Heavy breakable cast	53.00 to	56.00
No. 1 machinery cast	91.00 to	94.00

Detroit

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 54.00 to	\$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	30.00 to	31.00
No. 1 busheling	78.00 to	79.00
Drop large flashings	44.00 to	45.00
Machine shop turnings	42.00 to	43.00
Mixed borings and turnings	21.00 to	22.00
Shoveling turnings	42.00 to	43.00
Cast iron borings	24.00 to	25.00
Heavy breakable cast	35.00 to	36.00
Mixed cupola cast	50.00 to	51.00
Automobile cast	74.00 to	75.00
Stainless		
18-8 bundles and solids	540.00 to	550.00
18-8 turnings	415.00 to	425.00
430 bundles and solids	115.00 to	125.00

Youngstown

No. 1 hvy. melting	\$ 69.00 to	\$ 72.00
No. 2 hvy. melting	58.00 to	61.00
No. 1 dealer bundles	76.00 to	79.00
No. 2 dealer bundles	33.00 to	36.00
Machine shop turnings	26.00 to	29.00
Shoveling turnings	26.00 to	29.00
Low phos. plate	69.00 to	72.00
Electric furnace bundles	73.00 to	76.00
Galvanized bundles	66.00 to	69.00

Cleveland

No. 1 hvy. melting	\$ 58.00 to	\$ 61.00
No. 2 hvy. melting	49.00 to	52.00
No. 1 dealer bundles	80.00 to	83.00
No. 1 factory bundles	69.00 to	72.00
No. 2 bundles	30.00 to	33.00
No. 1 busheling	75.00 to	78.00
Machine shop turnings	18.00 to	21.00
Mixed borings and turnings	9.00 to	12.00
Shoveling turnings	26.00 to	29.00
Cast iron borings	18.00 to	21.00
Cut structural & plates,		
2 ft. and under	102.00 to	105.00
Low phos. punchings plate	102.00 to	105.00
Drop large flashings	54.00 to	57.00
Foundry steel, 2 ft. & under	71.00 to	74.00
No. 1 RR hvy. melting	45.00 to	48.00
Rails, 2 ft. and under	92.00 to	95.00
Rails, 18 in. and under	96.00 to	99.00
Steel axle turnings	59.00 to	62.00
Railroad cast	91.00 to	94.00
No. 1 machinery cast	90.00 to	93.00
Cupola cast	57.00 to	60.00
Stave plate	56.00 to	59.00
Stainless		
18-8 bundles	385.00 to	395.00
18-8 turnings	335.00 to	345.00
430 bundles	90.00 to	95.00

Buffalo

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 55.00 to	\$ 56.00
No. 2 hvy. melting	45.00 to	46.00
No. 1 busheling	70.00 to	71.00
No. 1 dealer bundles	69.00 to	70.00
No. 2 bundles	33.00 to	34.00
Machine shop turnings	17.00 to	18.00
Mixed boring and turnings	17.00 to	18.00
Shoveling turnings	23.00 to	24.00
Cast iron borings	23.00 to	24.00
Low phos. plate	77.00 to	78.00
Structural and plate,		
2 ft. and under	81.00 to	82.00
Rails, 2 ft. and under	81.00 to	82.00
Scrap rails, random lgh	65.00 to	66.00
No. 1 machinery cast	76.00 to	77.00
No. 1 cupola cast	58.00 to	59.00

St. Louis

No. 1 hvy. melting	\$ 50.00 to	\$ 51.00
No. 2 hvy. melting	39.00 to	40.00
Foundry steel, 2 ft.	48.00 to	49.00
No. 1 dealer bundles	50.00 to	51.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	15.00 to	16.00
Shoveling turnings	21.00 to	22.00
Cast iron borings	30.00 to	31.00
No. 1 RR hvy. melting	53.00 to	54.00
Rails, random length	59.00 to	60.00
Rails, 18 in. and under	72.00 to	73.00
RR specialties	70.00 to	71.00
Cupola cast	71.00 to	72.00
Heavy breakable cast	49.00 to	50.00
Stave plate	89.00 to	90.00
Steel car wheels	81.00 to	82.00
Rolling rails	69.00 to	70.00
Unstripped motor blocks	64.00 to	65.00

Birmingham

No. 1 hvy. melting	\$ 76.00 to	\$ 77.00
No. 2 hvy. melting	72.00 to	73.00
No. 1 dealer bundles	76.00 to	77.00
No. 2 bundles	51.00 to	52.00
No. 1 busheling	76.00 to	77.00
Shredder scrap	93.00 to	94.00
Machine shop turnings	27.00 to	28.00
Shoveling turnings	40.00 to	41.00
Cast iron borings	39.00 to	40.00
Electric furnace bundles	68.00 to	69.00
Elec. furnace, 3 ft. & under	72.00 to	73.00
Structural and plate, 2 ft.	93.00 to	94.00
Structural and plate, 4 ft.	88.00 to	89.00
No. 1 RR hvy. melting	88.00 to	89.00
Scrap rails, random lgh	80.00 to	81.00
Rails, 2 ft. and under	94.00 to	95.00
Angles and splice bars	86.00 to	87.00
No. 1 cupola cast	86.00 to	87.00
Unstripped motor blocks	76.00 to	77.00

Cincinnati

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 54.00 to	\$ 55.00
No. 2 hvy. melting	53.00 to	54.00
No. 1 dealer bundles	64.00 to	65.00
No. 2 bundles	34.00 to	35.00
Machine shop turnings	9.00 to	10.00
Shoveling turnings	11.00 to	12.00
Cast iron borings	15.00 to	16.00
Low phos. 18 in. and under	79.00 to	80.00
Rails, random length	64.00 to	65.00
Rails, 2 ft. and under	74.00 to	75.00
No. 1 cupola cast	59.00 to	60.00
Heavy breakable cast	24.00 to	25.00
Drop broken cast	71.00 to	72.00

New York

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 44.00 to	\$ 45.00
No. 2 hvy. melting	35.00 to	36.00
No. 2 dealer bundles	20.00 to	24.00
Mixed borings and turnings	10.00 to	11.00
Machine shop turnings	4.00 to	6.00
Shoveling turnings	10.00 to	12.00
Clean cast, chem. borings	35.00 to	36.00
No. 1 machinery cast	79.00 to	80.00
Mixed yard cast	50.00 to	51.00
Heavy breakable cast	10.00 to	12.00
Stainless		
18-8 prepared solids	520.00 to	540.00
18-8 turnings	420.00 to	440.00
430 prepared solids	90.00 to	110.00
410 solids	80.00 to	90.00

Boston

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 51.00 to	\$ 53.00
No. 2 hvy. melting	41.00 to	43.00
No. 1 dealer bundles	53.00 to	55.00
No. 2 bundles	34.00 to	36.00
No. 1 busheling	59.00 to	61.00
Shredder scrap	61.00 to	63.00
Machine shop turnings	12.00 to	14.00
Shoveling turnings	18.00 to	20.00
No. 1 machinery cast	75.00 to	80.00
Mixed cupola cast	48.00 to	48.00
Heavy breakable cast	9.00 to	10.00

San Francisco

No. 1 hvy. melting	\$ 38.00 to	\$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	17.00 to	19.00
Machine shop turnings	8.00 to	9.00
Cast iron borings	8.00 to	9.00
No. 1 cupola cast	80.00 to	82.00

Los Angeles

No. 1 hvy. melting	\$ 38.00 to	\$ 40.00
No. 2 hvy. melting	32.00 to	34.00
No. 1 dealer bundles	29.00 to	31.00
No. 2 dealer bundles	16.00 to	18.00
Machine shop turnings	13.00 to	14.00
Shoveling turnings	10.00 to	11.00
Cast iron borings	8.00 to	9.00
Elec. furnace, 1 ft. and under		
(foundry)	70.00 to	72.00
No. 1 cupola cast	72.00 to	74.00

Seattle

No. 1 hvy. melting	60.00 to	62.00
No. 2 hvy. melting	51.00 to	53.00
No. 2 bundles	35.00 to	37.00
No. 1 cupola cast	69.00 to	70.00
Mixed yard cast	80.00 to	82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 82.00	
No. 2 hvy. melting, cut 2 ft. and under	72.00	
No. 1 dealer bundles	83.00	
No. 2 bundles	58.00	
Mixed steel scrap	53.00	
Bulk new fact. prep'd	83.00	
Bulk new fact. unprep'd	73.00	
Machine shop turnings	35.00	
Short steel turnings	35.00	
Mixed borings and turnings	20.00	
Cast scrap	89.00	

Houston

Brokers buying prices per gross ton on cars:		
No. 1 hvy. melting	\$ 70.00 to	\$ 71.00
No. 2 hvy. melting	57.00 to	58.00
No. 2 bundles	43.00 to	44.00
Machine shop turnings	13.00 to	14.00
Crushed turnings	33.00 to	34.00
Shredder scrap	77.00 to	78.00
Cut structural plate, 2 ft. and under	100.00 to	101.00
Cut structural plate, 5 ft. and under	82.00 to	83.00
Unstripped motor blocks	40.00 to	41.00
Cupola cast	86.00 to	87.00

STEEL PRICES

PRODUCER KEY With Principal Offices

A7 Armco Inc., Middletown, Ohio
A8 Atlantic Steel Co., Atlanta, Ga.
A11 Atlantic Wire Co., Branford, Conn.

B1 Baran Drawn Steel Corp., Toledo, Ohio
B3 Bethlehem Steel Corp., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Steel Co., Harvey, Ill.

C6 CF&I Steel Corp., Pueblo, Colo.
C10 Copperweld Steel Co., Warren, Ohio
C16 Connors Steel Co., Birmingham, Ala.
C20 Calumet Steel Div., Chicago Heights, Ill.

D1 Detroit Strip Div., Cyclops Corp.

E4 Elliot Bros. Steel Co., New Castle, Pa.

F1 Firth Sterling, Inc., McKeesport, Pa.

G2 Granite City Steel Div., National Steel Corp., Granite City, Ill.
G3 Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.
G4 Greer Steel Co., Dover, Ohio
G5 Green River Steel Corp., Owensboro, Ky.
G6 Gibraltar Steel Corp., Buffalo, N. Y.
G7 Georgetown Steel Corp., Georgetown, S.C.

H1 Hercules Drawn Steel Corp., Livonia, Mich.

I2 Ingersoll Steel Div., Newcastle, Ind.
I3 Inland Steel Co., Chicago
I4 Interlake Steel Corp., Chicago

J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K2 Keystone Consolidated Industries, Inc.
K3 Kentucky Electric Steel Co., Ashland, Ky.
K5 Kemco Div., Foote Mineral Co., Keokuk, Ia.

L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens, Inc., Coatesville, Pa.

M2 McLouth Steel Products Corp., Detroit
M8 Mill Strip Products Div., National Steel Service Center, National Steel Corp.
M9 Moltrup Steel Products Co., Beaver Falls, Pa.
M11 Midwest Steel Div., National Steel Corp., Portage, Ind.

N1 Northeast Precision Steel Co., Boston

N4 Northwestern Steel & Wire Co., Sterling, Ill.
N6 Northwest Steel Rolling Mills, Seattle
N9 Nelsen Steel & Wire Co., Chicago
N10 North Star Steel Co., Saint Paul, Minn.

O2 Oregon Steel Mills, Portland, Ore.

P2 Phoenix Steel Corp., Claymont, Del.
P15 Philadelphia Steel and Wire Corp., Phila.

R3 Republic Steel Corp., Cleveland
R4 Ramco Steel Co., Buffalo, N. Y.
R5 Roblin Steel Corp., North Tonawanda, N.Y.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaco, Pa.
S10 Seneca Steel Corp., Buffalo, N. Y.

S16 Southern Precision Steel Co., Gulfport, Miss.

T4 Thomas Steel Strip Co., Warren, Ohio
T5 Timken Co., Steel Division, Canton, Ohio
T7 Texas Steel Co., Fort Worth, Tex.
T9 Triumph Electro Corp., Chicago
T10 Tennessee Forging Steel Corp., Harriman, Tenn.
T11 Teledyne Columbia-Summerill, Carnegie, Pa.

U1 United States Steel Corp., Pittsburgh

W3 Weirton Steel Corp., Weirton, W. Va.
W5 Wheeling-Pittsburgh Steel Corp.
W7 Wilson Steel & Wire Co., Chicago
W10 Wyckoff Steel Div., Ampco-Pittsburgh Corp., Pittsburgh
W14 Whittier Steel Strip Div., Whittier Industries, Ltd., Detroit

STEEL SERVICE CENTER PRICES

Price, Dollars per 100 lb

Prices are based on list prices reported to Iron Age by a number of metal service centers deemed representative by Iron Age and then weighted based in part on the reports received each month. Prices are not intended to reflect the actual transaction prices obtained by any individual metal service center.

G2	Granite City Steel Div., National Steel Corp., Granite City, Ill.	G3	Great Lakes Steel Div., National Steel Corp., Ecorse, Mich.	G4	Greer Steel Co., Dover, Ohio	G5	Green River Steel Corp., Owensboro, Ky.	G6	Gibraltar Steel Corp., Buffalo, N. Y.	G7	Georgetown Steel Corp., Georgetown, S.C.	H1	Hercules Drawn Steel Corp., Livonia, Mich.	I2	I3	I4	Ingersoll Steel Div., Newcastle, Ind.	Inland Steel Co., Chicago	Interlake Steel Corp., Chicago	J2	J3	J4	J5	Judson Steel Corp., Emeryville, Calif.	K2	K3	K5	Keystone Consolidated Industries, Inc.	Kentucky Electric Steel Co., Ashland, Ky.	Kemco Div., Foote Mineral Co., Keokuk, Ia.	L2	L3	L4	La Salle Steel Co., Chicago	Lone Star Steel Co., Dallas	Lukens, Inc., Coatesville, Pa.	M2	M8	McLouth Steel Products Corp., Detroit	Mill Strip Products Div., National Steel Service Center, National Steel Corp.	M9	Moltrup Steel Products Co., Beaver Falls, Pa.	M11	Midwest Steel Div., National Steel Corp., Portage, Ind.	N1	Northeast Precision Steel Co., Boston	Cities* City Delivery Charge*	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
																																																Hot-Rolled (10 gage)	Cold-Rolled (20 gage)	Galvanized (16 gage)	Hot-Rolled Strip	Plates	Standard Structurals	Hot-Rolled (merchunt)	Cold Finished	Hot-Rolled B&O As Rolled	Hot-Rolled A140 Annealed	Cold Drawn B&O As Rolled	Cold Drawn A140 Annealed																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																

Base Quantities: All HR products may be combined for quantity. Hot-rolled sheet, 10 ga x 36 x 96—120; Cold-rolled sheet, 20 ga x 36 x 120; Galv. sheet—16 ga x 36—120; Hot-rolled strip—1/8" x 1"; Plate 1/4" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds 3/4-2-15/16; Cold finished bar—C 1016—1" rounds; Alloy bar—Hot-rolled B&O—1-5/8" round; Cold drawn—1" round; Hot-rolled 4140—1-3/8" round; Cold drawn—1" round. Check local supplier for additions or deductions from base.

*Prices at all points include metropolitan delivery charges.

Codes identify Producers listed on p. 96. (Prices quoted are mill base prices in cents per pound unless otherwise noted and do not reflect extras or surcharges.) N.A. = Not available.

Billets, Blooms, Slabs

(Dollars per net ton)

Carbon Re-rolling, Midwest	
W5	\$366.00
N4	\$366.00
West	
C6	\$346.00
Carbon Forging, East	
B3(2)	\$473.00
C10, U1	\$473.00
R3	\$453.00
Midwest	
R3, W5	\$453.00
U1	\$473.00
S1, I3	\$473.00
C10	\$473.00
K2	\$473.00
West	
C6	\$420.00
Alloy, East	
R3	\$492.00
B3	\$512.00
U1, C10	\$512.00
Midwest	
W5	\$492.00
U1, I3	\$512.00
C10	\$512.00
R3	\$492.00
S1	\$512.00
West	
C6	\$469.00

Structurals

Carbon, East	
B3	22.90
J3	23.90
Midwest	
C20	22.90
W8	22.90
I3	23.90
T10	23.90
N4	23.90
South	
C16	23.90
T10	22.90
High-Strength, Low Alloy, East	
B3	22.90
J3	23.90
Midwest	
N4	23.90
W8	24.15
I3	23.90
South	
C16	23.90
Wide Flange, Carbon, East	
B3	22.90
U1	22.75
J3	23.90
Midwest	
U1	22.75
N4	23.90
I3	23.90
Wide Flange, High Strength-Low Alloy, East	
U1	24.30
Midwest	
U1	24.30

Strip

Hot-Rolled, Carbon, Cut II

Edge—all widths, East	
U1, B3	23.75
J3	22.05
Midwest	
D1	22.05
I4	22.85
J3, W3	22.05
G2, G3	23.45
N4	22.55
W5, S1	23.75
U1, A7	23.75
I3, B3	23.75
M2	22.05
R3	22.05

South	
R3	22.05
Cold-Rolled, Carbon Max. 25%, East	
E4	29.75
S10	29.60
P15	24.80
B4	36.60
G6	36.175
Midwest	
I4	38.30
W14	32.80
J4	34.05
S1	37.05

High-Strength, Hot-Rolled, Low Alloy, Cut Edge & Mill Edge, All widths, (plus extras)*

Midwest	
M2, R3	22.05
W3, J3	22.05
G2, G3	23.45
S1	23.75
A7	25.35
South	
R3	22.05
High-Strength, Cold-Rolled, Low Alloy, Mill Edge	
Midwest	
S1	37.05
Alloy, Hot-Rolled, Midwest (plus extras)*	
S1	26.10
I4	25.20
Alloy, Cold-Rolled, East (plus extras)*	
E4, M8	43.35
B4	49.75
P15	32.10
Midwest	
I4	44.30
S1	44.80

Sheets

Hot-Rolled, Carbon (18 Ga & Hyvri).

East	
B3	23.75
J3	22.05
U1	23.75
Midwest	
M2, R3, W3	22.05
D1, J3	22.05
G2, G3	23.45
I4	22.45
U1, W5	23.75
S1, B3	23.75
I3, A7	23.75
West	
U1	24.25
South	
R3	22.05
Cold-Rolled, East, Class I	
B3(2)	28.15
J3	26.15
U1	28.15
Midwest	
R3, M2, W3	26.15
G2, G3, M11	27.85
J3	26.15
D1	26.15
U1, W5	28.15
S1, B3	28.15
I3, A7	28.15
West	
U1	28.65
South	
R3	24.65
Galvanized (hot-dipped), East	
B3(2)	30.30
U1	30.30
Midwest	
J3, D1, W3	28.00
R3, Y1	28.00
G2, M11	30.00
U1, W5	30.30
S1	30.30
I3	30.30
A7	30.30
West	
U1	30.80
South	
R3	28.00
Enameling, Midwest	
U1, S1	29.65
I3, A7	29.65
J3	27.65
Long-Term, Midwest	
W5, A7, U1	31.65

R3	29.35
----	-------

Wire Rod

East	
B3(2)	22.35
Midwest	
N4, K2	22.35
U1	24.10
A7	22.00
West	
C6	21.45
South	
G7	22.35

Tinplate

Electrolytic Tinplate	
Single Reduced (70 lb)	
East	
J3	26.29
U1	28.99
Midwest	
U1	28.99
J3	26.29
M11	27.54
W3	26.29
W5	28.99
West	
U1	29.49
South	
U1	28.99
Double Reduced (55 lb)**	
Midwest	
M11	21.95
J3	21.49
U1	23.38
W3	21.49
W5	23.38
West	
U1	23.88
South	
U1	23.38
Black Plate	
Single Reduced (70 lb)*	
East	
B3	24.81
Midwest	
J3, W3	24.01
I3	24.57
W5	25.55
U1	26.27
M11	26.27
West	
U1	26.27
Double Reduced (55 lb)	
East	
B3	20.49
Midwest	
W5, M11, U1	20.49
J3	18.93
W3	18.93
West	
U1	20.49
South	
U1	20.49
*75 lb—base weight extra 69¢	
**50 lb—base weight extra \$1.40	

Bars

Carbon Steel, Hot-Rolled (Special quality)	
East	
R3, K3, R5	25.80
J3	25.80
U1	27.05
C10	27.05
B3	27.05
Midwest	
I4	26.00
U1, I3	27.05
R3, T10	25.80
C20, N4	25.80
K2	25.80
A7	20.25
West	
C6	24.45
South	
A8	20.65
C16	25.80
Cold-Finished Carbon, East	
A11	22.15
R3	33.75
T11, S8	31.00
J3(4), L2	31.00
M8, W10	31.00
N1	24.475

R4, B4	33.25
C10	31.00
Midwest	
W10, R3	33.25
J3	31.00
B1	33.45
L2	30.75
N9	31.00
W14	22.20
B5, M9	34.75
West	
R3	37.15
South	
J3	34.00
C16	24.40
J3	31.95
Alloy, Hot-Rolled, East	
R5, K3	27.95
R3, J3	27.95
U1	29.20
B3	29.20
C10	29.20
Midwest	
R3	27.95
I3, C10, U1	29.20
I4	27.35
A7	20.25
West	
C6	26.60
South	
A8	22.00
Alloy, Cold-Drawn, East	
L2	35.20
R3, N1	37.90
R4	37.10
J3, W10, L2	34.85
T11, S8	34.85
C10	34.85
Midwest	
R3	37.35
J3, W10, C10	34.85
B1	37.30
N9	34.85
L2	34.85
B5, M9	38.60
West	
R3	40.75
South	
J3	35.85
C16	28.00

Plates

Carbon Steel, East	
B3	23.25
L4, U1	25.75
P2	23.25
J3	26.75
Midwest	
B3	23.25
I3	25.75
J3, A7	22.80
U1, I4, S1	25.75
R3	26.75
West	
U1	25.75
O2	23.00
South	
R3	25.75
U1	25.75
Alloy East	
B3	31.05
U1, L4	33.55
P2	33.55
J3	34.55
Midwest	
B3	31.05
I4, U1	33.55
West	
O2	31.00
South	
U1	33.55

Wire

Carbon Steel Wire, East	
B3	27.10
A11	22.15
Midwest	
R3	24.60
N4, W7	27.40
K2	24.20
South	
A8	22.85
West	
C6	24.95

UP-AGAIN, DOWN-AGAIN; ORDERS DOWN AGAIN

Following a hopeful three-month stretch of increases, durable new orders skidded in July. Orders received by durable goods producers were down 2.3 pct from June.

It is hard to tell if the July slide was just a setback in an uptrend or a turnaround in direction for orders. After all, over the past 12-month period through July, orders slipped seven months and were up five months.

This up-and-down trend resulted in little over-the-year growth thrust for orders. Dollar volume in July was up only 2.4 pct from the same period a year ago. Worse, orders in July were down 1 pct from dollar volume at the start of this year.

These are tough days for corporate planners trying to draw a bead on the outlook for new orders for durable goods. As one noted, "Going back a year in time, who would then have forecast a roller-coaster ride for orders for the next 12 months?"

In looking at July orders data, it is clear where the big weakness in orders was centered during the month. Total orders were down \$2.4 billion, or 2.3 pct. Some two-thirds of that decline came in transportation equipment industries, specifically, in aircraft, missiles and parts and in shipbuilding and military tanks. Aircraft and parts orders—the big losers—decreased \$1.2 billion.

Also down in July were most machinery lines, both electrical and nonelectrical. Further, a \$200 million decline in primary metals orders marked the July period.

Much of the orders softness in July was centered in defense-related orders in aircraft and shipbuilding. And beyond the single month of July, it has been flip-flops in defense-related orders that has accounted for much of the up-and-down trend for total orders.

Billions of Dollars, Seasonally adjusted
Monthly Total, unless otherwise noted
Source: U.S. Dept. of Commerce

CAPITAL EXPENDITURES (Annual Rates)

	3rd Qtr*	Latest Month vs 12m	Previous Month vs 12m	Same Period Year Ago
U.S. Industry, Total	3rd Qtr* \$392.6		\$385.3	\$361.1
Manufacturing, Total	3rd Qtr* 160.8		155.5	142.0
Manufacturing, Durable Goods	3rd Qtr* 77.8		75.7	68.3
Mining Industry	3rd Qtr* 16.2		16.5	17.0

KEY INDICATORS, Durable Goods Manufacturing

New Orders	July 104.4	106.8	102.0
Shipments	July 102.5	102.7	97.8
Inventories	July 192.4	192.2	184.6
Unfilled Orders	July 351.1	349.3	348.7

NEW ORDERS, METALWORKING

Capital Goods Producers, Nondefense Industries	July 26.5	28.0	28.1
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Capital Goods Producers Defense Industries	July 9.7	11.2	7.6
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Primary Metals, Total	July 10.6	10.7	11.0
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Steel (SIC 331)	July 4.5	4.3	4.4
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Iron & Steel Castings (SIC 332)	July 1.3	1.2	1.4
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Nonferrous Metals	July 4.8	5.2	5.2
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Nonelectrical Mach.-Equip. Industries, Total	July 17.6	17.8	18.7
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Engines & Turbines	July 1.3	1.5	2.1
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Farm Machinery & Equipment (Shipments)	July 0.8	0.8	0.8
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Construction, Mining & Mat. Hdlg. Equip.	July 3.1	2.8	2.8
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General Industrial Machinery	July 1.3	1.5	1.4
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Fluid Power Equipment** (Index 1972 = 100)	July 261.0	254.0	282.0
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Metalworking Machinery	July 1.0	1.0	1.2
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Machine Tools, Total (\$Mill., Unadjusted)***	July 201.0	235.2	313.4
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Machine Tools, Metalcutting***	July 151.0	182.9	135.9
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Machine Tools, Metalforming***	July 50.0	52.3	177.5
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Electrical Mach. & Equip. Industries, Total	July 15.0	16.2	16.2
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Elec. Transmission Equip. & Ind. Apparatus	July 2.1	2.0	2.0
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Household Appliances	July 1.3	1.5	1.5
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Communication Equipment	July 5.0	6.7	5.1
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Transportation Equipment, Total	July 26.7	28.3	25.2
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Motor Vehicles & Parts (Shipments)	July 15.8	15.3	15.6
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Aircraft, Missiles & Parts	July 9.4	10.6	8.4
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Shipbuilding & Military Tanks	July 1.1	1.4	0.5
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Fabricated Metal Products, Total	July 14.2	13.4	11.4
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Instruments, Total	July 5.1	4.9	4.6
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CHILTON'S

October 18, 1985

IRON AGE

MANUFACTURING MANAGEMENT

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MANUFACTURING MANAGEMENT



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PLEASE, NO MORE MYTHS ABOUT THE DECLINE OF U.S. MANUFACTURING



BY JOHN D. BAXTER

Everybody *knows* that manufacturing in this country "just isn't what it used to be."

"We're getting to be a service economy," is a phrase heard over and over.

And there is the refrain that goes, "Let's face it, those Japs are just too tough."

Don't forget the cry, "Our factories can't compete with all those low-wage countries."

And, of course, everyone knows of a *lot* of friends and relatives that used to work in plants but were laid off—for good.

These people see other signs of the almost certain demise of manufacturing in this country. They don't have to look far. The driveways besides their homes are full of foreign-made cars. Their living rooms and playrooms are loaded with foreign-

made TVs and VCRs.

On their way to their banking, government and auto repair jobs, these people pass long-idled factories with For Sale signs plastered on their walls. They watch TV specials on hard-bitten towns in America's industrial heartlands—the Rust Bowl. And their favorite news magazine tells them that the current U.S. world trade balance is "the biggest ever run up by any country in history."

All these signs of decline, and likely demise, of U.S. manufacturing are starkly visible. They are publicized to the point of exploitation.

But the truth about the situation of manufacturing in this country is barely visible. This truth burns dimly like candlelight in a world of searchlights.

A Different Look

Still, among economists and other analysts who seriously probe the issue of the state of health of manufacturing in this country, there seems to be held a heartening consensus: American manufacturing is **not** by any means on its last legs.

In sum, their findings blast two great myths about the situation in manufacturing: Myth one: Manufacturing is declining in importance in the U.S. economy. Myth two: U.S. manufacturing is no longer competitive in world trade.

These analysts see problems, of course. But for most of U.S. manufacturing, they see the problems as acute rather than chronic. Too, they readily concede that for goods producing industries accounting for about one-fifth of U.S. manufacturing output, serious long-term problems do indeed exist. In those industries, hard decisions are being made and tough actions taken to cope with those problems.

It is the problems of these troubled industries—motor vehicles, iron and steel, textiles, shoes and leather, knitting and apparel—that has triggered much of the widely-held view that U.S. manufacturing, *per se*, is in deep, deep trouble.

DEBUNKING MYTHS ON THE 'DECLINE' OF U.S. MANUFACTURING

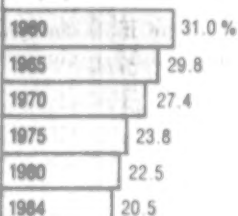
MYTH NO. 1

Manufacturing is declining in importance in the U.S. economy.

Everybody knows about and talks about the long-term decline in employment in manufacturing. The trend is cited as 'proof' of the decline in importance of manufacturing in this country.



Manufacturing Employment as Pct of Total Nonagricultural Employment



Source: U.S. Labor Dept.

But...of greater importance, manufacturing still accounts for as large a share of national output as in its so-called "glory days."

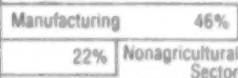
Manufacturing as Share of GNP Value Added by Manufacturing as Share of Real GNP, Pct.



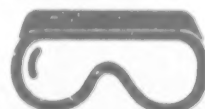
Source: U.S. Commerce Dept.

The high share of output with declining employment reflects a big 'plus' for manufacturing—its productivity growth has far outpaced the overall U.S. economy.

Productivity Growth, U.S. Manufacturing vs. Total U.S. Nonagricultural Business Sector, Pct. Increases 1970-1984



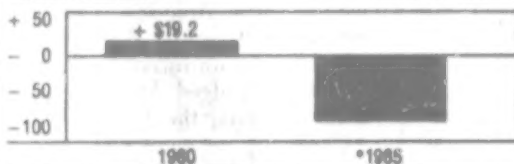
Source: U.S. Labor Dept.



MYTH NO. 2

U.S. manufacturing is no longer competitive in world trade.

U.S. Manufactured Goods Trade Balance Billions of Dollars



* As of Feb.
Source: U.S. Commerce Dept.

Head-to-head world industrial competition, in general, is not at issue. U.S. manufacturing's long-held strong trade surplus turned to deficit only after 1980, due chiefly to...

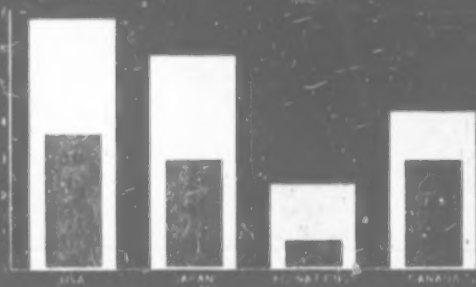
...a dollar that since 1980 soared wildly in exchange value—in effect, cutting the price of each import by 40 pct and adding a tax of 40 pct to each U.S. export.

Rise in Value of U.S. Dollar, Pct., 1980-85 Multilateral Trade-Weighted Nominal Value

Source: FRB

*France, Germany, Italy, UK, Belgium, Luxembourg, Denmark, Greece, Ireland, Netherlands

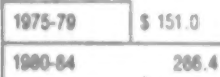
Economic Growth Rate, U.S. vs. Other Nations



Further, the stronger economic growth of this country relative to world competitors over the past two years...

...served as a magnet for imports from foreign industries faced with relatively sluggish markets at home.

Imports of Goods to USA, Total Annual Avg. per Year, Billions of Dollars



Source: U.S. Commerce Dept.



M

ANUFACTURING TODAY ACCOUNTS FOR AS LARGE A SHARE OF THE NATION'S OUTPUT AS IT DID IN ITS SO-CALLED 'GLORY DAYS.'



A study, on economic change and industrial decline, made last year by economists at the New York Stock Exchange (NYSE), summed up: "Much of the concern about the decline of the U.S. manufacturing sector stems from the unfortunate tendency to extrapolate the experiences of a relatively small number of industries which have hit upon hard times."

The report added: "Despite some very troubled industries, on the whole manufacturing has not performed all that badly in recent years."

"Therefore, to suggest that the manufacturing sector in particular is in decline cannot be considered a proper characterization."

The NYSE study further noted that if the recent performance of the "Sick Six" industries is excluded from the manufacturing trend, then actual "improvement" in the U.S. manufacturing situation is discernable.

The Long Look

It may seem off-base at this point in time to include the U.S. auto industry in a list of sick or troubled industries. The industry, in September, broke all-time sales records. Too, it may seem odd to exclude from any list of troubled industries the producers of agricultural equipment. That industry has been in a depression for four years.

But it is the long-term trends the economist looks at to determine if manufacturing as a whole is declining in size and importance, or if it is unable to further compete in world markets.

There is one long-term trend that makes it appear that manufacturing in this country is on a certain downhill slide. That is the employment trend. The curve line of employment in manufacturing has been one of steady long-term decline. This is a highly visible phenomenon that packs a lot of emotional wallop with the public and is eagerly headlined by the press. It is a trend that puts in total eclipse other trends favorable to manufacturing.

The measure of employment preferred by most economists is manufacturing employment as a percent of total nonagricultural business sector employment. As charted on these pages, that ratio of manufacturing employment has fallen steadily for decades. In 1960, U.S. manufacturing industries employed 31 pct of all workers in the nonagricultural sector. Last year, manufacturing employed only 20.5 pct of such workers.

A Cool-Headed Look

Further, the years 1980-83 marked the first time in postwar history that employment in U.S. manufacturing fell for four consecutive years.

A tempering hand recently was

placed on these scary figures by Robert Solomoa, a former Federal Reserve Board official and now Guest Scholar at the Brookings Institution. "The reports on employment may well have created the impression that the goods-producing sector of the economy is shrinking, whereas what has actually happened is that productivity has risen faster in this sector."

Mr. Solomon added, "Neither goods output nor industrial production shows a significant slowing relative to the total output of the American economy."

These points raised by Mr. Solomon are shown graphically in the chart displays here. One shows that the share of total U.S. output accounted for by manufacturing has changed little during the past 25 years. This is looking at manufacturing in terms of its value added—total manufacturing income less payments to other industries.

Commented Mr. Solomon on the figures, "The aggregate data on the composition of U.S. output indicates very little, if any, weakening of manufacturing relative to total output. Goods output as a proportion of GNP has been remarkably stable over the years. In the first quarter of 1985, it was near the upper end of its normal range."

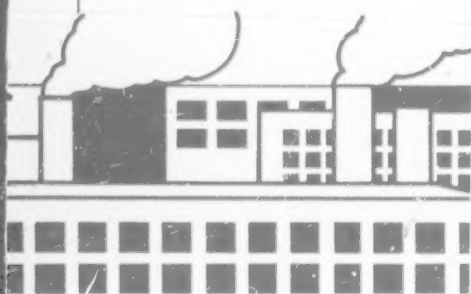
So, those who look at the long-term manufacturing employment downtrend—and the rise of jobs in services—talk excitedly about a Post-Industrial America, and of a service economy. But, noted Brookings economist Robert Z. Lawrence, "judged by the output share of goods, the United States was virtually no more of a service economy in 1980 than it was in 1960."

And James Fallow, a business analyst and writer, noted recently in the *Atlantic Monthly* that "service industries have employed more Americans than has manufacturing for at least 100 years." So what's new?

A Big Plus

In sum, manufacturing employment has declined over the long-

SINCE 1970, PRODUCTIVITY GROWTH IN MANUFACTURING HAS OUTPACED THAT OF THE OVERALL U.S. ECONOMY BY A MARGIN OF BETTER THAN TWO TO ONE.



term. But more importantly, manufacturing's share of total output has remained rock-steady. And the main reason underlying this continued strength, is in itself, another big 'plus' for manufacturing: Manufacturing productivity in recent years has grown at more than double the growth rate of the overall U.S. business nonfarm sector. As one chart here shows, in the period 1970 through 1984, productivity in manufacturing grew 46 pct; output per hour per person in the total nonagricultural business sector by 22 pct. That evidence hardly makes out manufacturing to be a dying sector of the U.S. economy.

The response of the analysts to the myth that manufacturing is de-

clining in importance in the economy is to resoundingly reject that notion.

But what about Myth No. 2, one that is probably held even more firmly by many Americans? That myth is that U.S. manufacturing is no longer competitive in world trade.

The *proof* underlying this myth is the sight of foreign-made products that fill American stores, offices, highways and homes. The other part of this vision is shuttered mills across the U.S. landscape.

A Deep Probe

One group of economists which has probed long and deep into the U.S. trade situation is the President's Council of Economic Advisers (CEA). Trade is a subject of great importance to them because of national policy implications. In last year's Economic Report to the President, the advisers made a special analysis of the trade situation. Here's one of its key statements:

"It is easy to draw the impression that there is a serious adverse long-term trend in the competitive standing of the United States in the world economy. The greatest danger is that such ideas will come to be believed, and as a result, the nation will opt for major departures from its traditional economic system."

How can the President's economists make such a statement in the face of 10 years of U.S. trade deficits that will total an estimated \$500 billion through the end of this year?

Simply, the CEA has sorted out temporary influences from long-term trends. The suddenness of the recent collapse in the U.S. trade balance gives credence to their point of view. This 'suddenness' shows up dramatically in trade data on manufactured goods.

In the three-year period 1979-81, U.S. manufacturers rolled over world competitors as they had over an almost unbroken chain of years since 1887. In that three-year span, American goods producers rang up an import-export trade surplus of \$35 billion.

But...over the next three years,

U.S. manufacturers were slammed by a staggering \$114 billion trade deficit.

A \$149 billion turnaround in trade in back-to-back, three-year periods! What happened?

Mystery Cleared

The CEA argued its case on the overall trade deficit, which in 1983 and 1984 totaled \$170 billion—more than two and a half times that of the previous two years. It stated:

"Although the trade deficits (1983-84) are without precedent, they are not difficult to explain. To begin with, the United States has a normal or 'structural' deficit in merchandise trade that is offset by a surplus in exports of services and therefore need not be a cause for special concern.

"But it is the recent increase in the trade deficit that has attracted attention. The increase can be broken down into three parts. First, the appreciation of the dollar has made it difficult for U.S. firms to compete in world markets. Second, there has been a substantial loss in net exports to debt-troubled countries. Third, the U.S. is experiencing more rapid growth in income, and therefore, in imports, than are Europe and Japan."

The report added, "Those three factors concern economic perturbations that, though large, are believed to be temporary. The structural deficit is normal in that it would exist even in the absence of temporary factors."

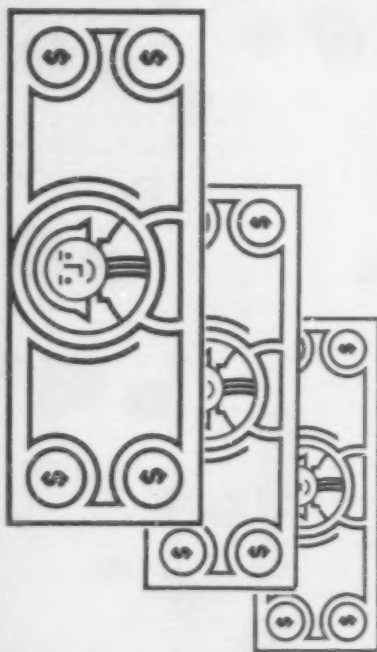
The CEA further said the structural trade deficit "now appears to be in the range of \$20 billion to \$25 billion."

Clearly, in the view of the CEA—and many other economists and business executives—the greatest injury to the U.S. trade position comes from the great surge in the dollar in world currency exchanges. This began in 1980. The CEA blames that factor for 60 pct of the recent years' turnaround.

A Close Match-Up

In the second series of charts shown here, it is seen that the U.S.

THE RISE OF THE DOLLAR SINCE 1980, IN EFFECT, CUT PRICES OF IMPORTS BY 40 PCT AND RAISED PRICES OF EXPORTS BY 40 PCT.



trade balance in manufactured goods went from a \$19 billion surplus in 1980 to a near-\$100 billion deficit level as of February of this year. That turnaround fits hand-in-glove with an 81 pct rise in the dollar over the same period.

When the CEA says, "the appreciation of the dollar has made it difficult for U.S. firms to compete in world markets," it makes a bland understatement. In effect, the dollar rise from 1980 through February of this year raised prices of U.S. exported goods by 40 pct and lowered prices of goods imported into the U.S. by 40 pct. Even industries with the strongest long-term success records could be expected to buckle under those conditions.

The dollar, as of September of this year, has come down by about 15 pct. Will it depreciate more?

That question, economists apparently feel is unfair. It appears they don't even know where exchange rates were in the past. Here's what the CEA said in the 1983 Economic Report to the President:

"Exchange-rate movements are not well understood. Econometric models of exchange rate determination proposed in the past decade have not shown any consistent ability to track past exchange-rate movements, let alone predict future changes."

Beyond the dollar impact on trade, there is the second impact cited by the CEA, and others: Economic growth in this country in 1983-84 far outpaced growth in leading industrial nations.

The CEA estimated that this growth rate disparity accounted for almost 20 to 25 pct of the U.S. trade deficit last year. A chart here shows that U.S. economic growth surpassed that of even Japan.

This growth rate imbalance made the relatively active U.S. markets inviting to foreign goods producers. And this was doubly true because at the same time U.S. markets were burgeoning, the home markets of these foreign manufacturers were in a relative doldrums. So, they stepped up their efforts to export to this country. On top of this temporary situation, American markets, as always, were the biggest for just about any product and entry to its rich markets as easy as anywhere in the world.

Another chart here shows the impact of the resulting great import invasion. In the 1975-79 period, imports to this country averaged \$151 billion per year. In the 1980-84 period, imports averaged \$266 billion a year—a 75 pct increase.

Another Problem

As the CEA indicated, another reason for the recent explosion in U.S. trade deficits is found in the huge debts of developing nations. The economists estimated, for example, that between 1981 and 1983,

the U.S. loss in net exports to Latin America was about \$21 billion. Those nations weren't interested in buying goods from anybody. They were interested only in exporting to obtain badly needed funds that would help keep their debts from strangling them.

So, there is no question that U.S. manufacturing industries have been under siege—chiefly since 1980. Still, there has been no decline during that siege in the share of GNP accounted for by manufacturing. In other words, there has been no decline in the importance of manufacturing in this country.

Also, there is little reason to believe that U.S. manufacturing, as a whole, has lost its ability to compete in world markets. Temporary extraordinary factors have deeply hurt U.S. manufacturing, just as they have the entire nonmanufacturing sector of the economy. There is no way U.S. manufacturers could escape injury in a string of years when a runaway dollar sharply raised the prices of their goods for export and, at the same time, sharply cut the prices of products of their world competitors.

But eventually, even currency exchange values have a way of righting themselves. They have before. There are signs they are doing so right now.

Still, to say that all the problems of all of manufacturing are a passing thing is inaccurate. Many basic goods manufacturers in this country face long-term problems of a pressing nature. Some face patently unfair trade hurdles that cry out for remedies beyond their own reach; remedies that require trade negotiations or legislation.

But mostly, the problems faced by many basic goods manufacturers are long-term ones of supply-demand imbalance. Problems of this kind can be dealt with—and are being dealt with by industry leaders—over long periods of time. Even this difficult realignment and restructuring will become easier when the temporary crushing weights of recent years, such as the soaring dollar, have run their course. □

ALUMINUM FLOWING FREELY

Despite production cuts and smelter shutdowns, there is still plenty of aluminum and plenty of pressure on the metal's price.

BY ROBERT REGAN

There's nothing wrong with the aluminum industry that a dose or two of better prices won't cure.

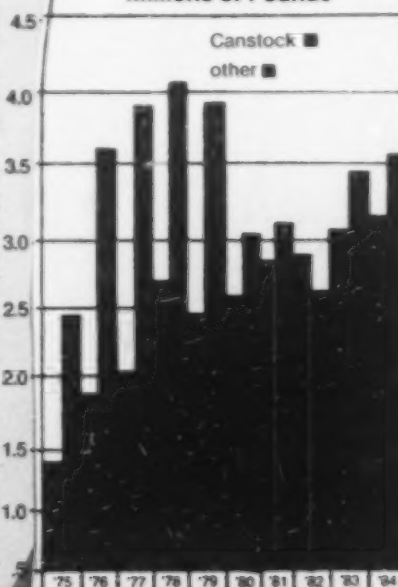
Incoming order rates and shipping volume this year are right up there with the best. Important markets like can stock, building and construction and transportation are doing as well as can be expected. Popular volume forecasts for 1985 cluster around 15.2 billion lbs, only 1.3 pct off the 1984 record.

The problem is that the old tried and true medicine apparently isn't taking—or at least isn't taking fast enough. Despite production cuts, mothballing and outright smelter shutdowns, there still has been too much metal out there and the condition has been spreading to rolling capacity, particularly in the all-important containers and packaging end of the business.

Complications stem from the strong U.S. dollar, which according to Aluminum Association calculations, helped mill products made outside the U.S. to a 7.6 pct share of the domestic market last year. All of it adds up to a buyer's market with prices determined accordingly.

The situation has been most evi-

Aluminum Sheet Shipments
Millions of Pounds



The importance of can stock to the aluminum industry is evident in the nearly 40 pct share of total sheet shipments in 1984, compared with 26.2 pct 10 years earlier. Can stock shipments have risen steadily in the 10-year period. So have the can recycling figures, only faster. The 1.25 billion lbs of can stock recovered last year was equal to 37.7 pct of can stock shipments. Ten years earlier, can stock recovery was equal to 13.8 pct of can stock shipments.

Source: Aluminum Association * Includes imports

dent in the ingot market, where the London Metal Exchange price holds up an easy-to-read thermometer. But it also hampered profitability in the canstock business, which alone accounts for nearly 23 pct of domestic order bookings. Can stock shipments will move up again this year—Reynolds Metals Co. estimates a 6.1 pct jump to 3.45 billion lbs—but the pressure on prices has been the other way around.

Imported can stock took about 8.7 pct of the domestic market last year (the import share is down a bit this year, according to some industry sources) but there's some added pressure on the horizon with the advent of Logan Aluminum, Inc., which has completed qualification trials with some of the canmakers. The big Kentucky mill is 60 pct owned by Atlantic Richfield Co., which is looking for a buyer, and 40 pct by Alcan Aluminium Ltd.

Robert Hoffman, group vice president of rolled products for Aluminum Co. of America (Alcoa), sizes up the

U.S. Aluminum Trade

(Millions of lbs)

	Imports		Exports	
	Ingot	Mill Products	Ingot	Mill Products
1984	1,945	1,090	572	504
1983	1,637	618	795	446
1982	1,359	456	802	492
1981	1,421	304	688	682
1980	1,161	168	1,429	763
1979	1,142	426	401	622
1978	1,516	484	253	494
1977	1,341	165	196	517
1976	1,151	189	305	516
1975	868	130	372	433

Source: Aluminum Association, U.S. Department of Commerce

The big jump in shipments of aluminum came to the U.S. market last year was drawn by the strong U.S. dollar to an easily accessible market. Biggest gainers were Japan, Venezuela, Canada, Australia and Europe. The big surge in ingot exports in 1980 reflected a doubling of shipments to Japan and the rest of the Asian market.

Japanese as formidable competitors in the canstock business. He said they have the equipment and capacity to keep pace with the thinner and wider sheet the U.S. canmakers demand, but "it remains to be seen if they can match our quality improvements in gage control, surface, profile and internal consistency."

Alcoa over the past year has made considerable investment in its rolling facilities. As has been the case with similar programs by other U.S. companies, the emphasis went on quality control, but there also was some addition to capacity. But the Logan mill, the industry's newest greenfield mill, and a smaller but substantially sized canstock mill under construction for Alumax, Inc., in Texas, are the big capacity adders.

Asked how the 1986 canstock market will absorb the output of the two new mills and rising imports, Mr. Hoffman replied, "We are unaware that Logan has qualified anywhere (and) our information suggests that imports are declining."

He also said Alcoa still believes Japanese canstock shipments to the U.S. market will decline as the home and other Asian markets grow and as recovery in the aluminum market generally increases the cost of ingot and aluminum scrap the Japanese

now draw heavily from the U.S.

The Alcoa official declined to link the company's threatened Section 301 action against the Japanese with canstock shipments here. Most of the Japanese aluminum shipped here is can stock, but "the 301 action has to do with permitting Alcoa's products into Japan on equal terms with their shipments here." Asked if the sizable shipments of U.S. scrap and ingot to Japan weakened the aluminum trade argument, he would say only that "those imports are more a result of Japanese raw material requirements which are not available at home."

As for plans in the beverage industry to introduce a 12-oz plastic soda can, Mr. Hoffman said this won't be a problem next year, but it could be one perhaps within five years. The conditions, he said, are "if they can solve their recycling and cost competitive problems and, if these are solved, will the penetration be at the expense of aluminum, or glass, or both?"

Reynolds Metals said industry shipments of can stock next year should match this year's 3.45 billion lbs. The company said beer sales have flattened on a gallonage basis and any growth for aluminum on this side of the market would have

to be via edging out glass bottles, presumably by moving up into the larger beer container sizes.

Aluminum's growth on the soft drink side of the business should continue, the company said. As for plastic soda cans, Reynolds said it doesn't see any real threat yet but, if they take hold, the company will expand its container manufacturing operations to include them as well.

Reynolds also noted that canstock growth can't be measured on a weight basis alone because the 66 lbs of aluminum it took to make 1,000 cans two decades ago has been pared to 26 lbs today and there has been commensurate improvement in canstock prices, and productivity improvements to boot.

Asked if imports were the main reason for de facto extension of the 12-month price freeze on can stock that was to have run out last April 1, a Reynolds official replied, "Pricing of can stock and other products is determined by available supply of base materials and rolling capacity of U.S. mills. Growth of canstock supply, especially from imports, coupled with flatter demand weakened the prospects for price increases after April 1, despite cost increases, and prices continue sluggish in this market."

Reynolds Strategy

Reynolds said its main strategy remains upgrading quality and facilities, plus more internal consumption of can stock because "imports, especially from Japan, will continue to be a major factor even with the recent declines in the U.S. dollar."

William T. Sullenberger, vice president marketing and sales for Commonwealth Aluminum Corp., said the strong points for mill products from its Lewisport, Ky., facility are building and construction products, can stock and short lead time distributor business.

Mr. Sullenberger said the approaching mid-1986 deadline on current aluminum industry wage pacts could bring some changes in buying strategies of the service centers and other customers, "but I don't think inventories will return to

what they used to be. There isn't really a scarcity of metal and customers have been able to buy what they want when they want it. And I don't think anybody really expects a labor problem in 1986. Labor is working with management to keep the plants in business."

Asked if he thought the LME and Comex hedge markets had overplayed the oversupply situation, Mr. Sullenberger said, "the LME and Comex have little to do with actual business; it's a matter of speculators not making any money on market movement. Right now, they're not interested in buying. It may be they have a new (producer) inventory level in mind and it hasn't reached that level yet, but who knows?"

Alumax President Robert Marcus said it was a fair assumption that the hedge markets had overplayed the surplus. "There has been an increase in consumption of primary aluminum and Alumax, along with other major U.S. producers, has taken steps to reduce ingot inventory this year. I believe the economics are favorable and an improvement can be expected."

During the 1982 recession, Alumax pursued a strategy of building ingot inventory to be in a position to cash in during the next upcycle. It isn't following this plan this time around, however. Mr. Marcus noted the company had a substantial cash reserve before, but debt was increased and cash reserve trimmed in 1983 with the purchase of Pechiney's North American aluminum properties. The strategy this year has been to curtail production and hold inventory down.

Alumax's CEO also said he believes the ingot market "will be in much better condition" when the new 230,000 metric tons a year Becancour, Que., smelter comes onstream in mid-1986. Pechiney Corp., the Greenwich, Conn.-based unit of Pechiney of France, holds a 50.1 pct interest in the smelter and Alumax and Quebec's Societe Generale de Financement each hold 24.95 pct. A 20 pct reduction in power required per ton of aluminum over average North American smelt-

er power use is claimed for Becancour, which is designed for 50 pct capacity expansion.

Mr. Marcus also said construction of the company's Texarkana, Tex., can sheet mill and aluminum recycling plants is proceeding on schedule and they should be onstream by the end of the first quarter of 1986. Feedstock for the 75,000 tons a year can sheet mill will be recycled beverage cans with amounts of primary metal added from time to time.

A Kaiser Aluminum & Chemical Corp. spokesman said the Logan mill can be regarded "as another competitor in a highly competitive market. However, quality will be the main issue and that's where the game is going to be played."

Kaiser Aluminum's modernization program for its big Trentwood, Wash., mill requires, he said, situating a few more pieces of equipment in the finishing department. "And," he added, "we have been getting favorable customer response on can stock produced on the upgraded five-stand cold mill."

Looking at the market situation in general, he said customers generally build up inventory in front of labor negotiations, but it was difficult to predict how things will go next year. He said it also was difficult to judge whether or not the hedge markets had overplayed the slow reaction of producer inventories to the production curbs. LME prices usually slump in August-September but post-Labor Day prices "hit an all-time low this year, so there could be some overreaction going on."

Auto Recovery

Another strong point (volume-wise, at least) for the aluminum companies this year has been continued recovery in U.S. car and truck production, which rose in the first three quarters.

During the 1970s, when per-car aluminum use was making impressive gains, aluminum prices were rising fast and Detroit wasn't happy about it. There have been no fast-rising aluminum prices in the 1980s, but the carmakers still hang tough in the procurement department.

Kaiser Aluminum, which recently won the nod as major supplier of GM's aluminum requirements for the 1986 model year, said "the moderation of aluminum prices has been advantageous for the automobile industry and, concurrently, aluminum's position in automotive usage has been strengthened. But, obviously, the cost of competitive materials is always going to be an important criteria."

Kaiser also said the auto companies are likely to look for "partnership arrangements" in the future, presumably of the tolling variety.

A spokesman for Cleveland-based Alcan Rolled Products, a unit of the Canadian aluminum company's U.S. arm, Alcan Aluminum Corp., said: "Detroit still is interested in lowering the cost of its products and we think weight saving still will be important. There is room for growth, but we see it more in terms of castings than body sheet."

Alcoa's Mr. Hoffman said the company believes the Detroit automakers "have a more secure feeling now about long-term prices of aluminum. Progress with Detroit on aluminum-intensive car designs is painfully slow; in fact progress offshore shows more promise."

He said aluminum use per average passenger car is slightly higher in the 1986 models.

William O. Bourke, president and chief operating officer of Reynolds Metals, said aluminum's current price levels "certainly make aluminum a more cost-competitive material for Detroit compared to a few years ago," but pricing to the auto industry today reflects supply and demand considerations in the aluminum industry today.

Mr. Bourke, who has extensive background in the auto industry, said the current 139 lbs per average car for 1986 models should top 200 lbs in the 1990s. The major growth, he said, will be in cast and wrought components, rather than in sheet applications. He also noted, somewhat wryly, that car imports don't help domestic aluminum companies, although overseas units supply some foreign car companies. □

MATERIALS PRICES

PRICE & PRODUCTION DATA

(Effective September 23, 1985)

Steel production by districts, thousands of tons
(000 omitted)

	Last Week	Two Weeks Ago	Month Ago	Year Ago
Northeast Coast	169	183	168	124
Pittsburgh	154	159	165	230
Youngstown	97	97	94	99
Lake Erie	143	112	129	159
Detroit	144	134	141	116
Chicago	476	461	492	350
Cincinnati	93	95	96	81
St. Louis	68	72	70	74
Southern	181	185	191	159
Western	69	84	77	70
U.S. Production	1,594	1,582	1,623	1,462

Source: American Iron & Steel Institute

Lake Superior Ore Prices

51.50% Fe Natural delivered lower Lake ports. Rail transportation, handling and unloading may be charged to the account of the buyer. Coarse ore 80¢ premium.

Pellets (per iron unit natural)	gross-ton 59.4*
Pellets (per iron unit natural)	gross-ton 72.5-86.9**
Mesabi, regular-unscreened	gross-ton \$32.53
Mesabi, non-bessemer	gross-ton \$30.03-31.53***

*59.4¢—Pickands Mather, 8/1/85, delivered hold of vessel, upper Lake ports.

72.5¢—U.S. Steel as of 8/16/85. **86.9¢—Oglebay Norton 3/25/82; Hanna Mining and Cleveland-Cliffs, 2/26/82. *Effective 8/1/83.

NONFERROUS PRICES

(Effective September 23, 1985) Prices obtained in trade based on representative tonnages per gross ton delivered to consumer unless otherwise stated.

Primary Metal Prices

(cents per lb.)	current price	last price	date of change
Aluminum (LME)	44.11	44.88	9/23/85
Copper (C)	64.00	63.50-64.00	9/23/85
Lead	19.00-20.00	18.50-20.00	9/23/85
Magnesium Ingot	148.00	143.00	5/25/84
Nickel (LME)	201.12	212.81	9/23/85
Titanium Sponge	555.00-585.00	555.00	4/29/82
Zinc	41.00	41.00-47.00	8/19/85

ALUMINUM: Avg. for last week & previous week. COPPER (C) = cathode. LEAD: common grade. MAGNESIUM: 99.8% pig, delivered. NICKEL: Avg. for last week & previous week. ZINC: high grade.

Antimony, American Laredo, Texas	\$2.00
Beryllium-aluminum 5% Be, per lb. contained Be	\$236.00
Beryllium-copper, per lb. cont. Be	\$144.00
Beryllium 97% powder 200	\$197.00
Cadmium, ton lots	\$1.00-1.25
Calcium, ton lots, crown	\$3.76
Chromium, 99.8%	\$3.75
Cobalt, 99%, cathode	\$12.50
Gold per troy oz.	\$327.70
Indium, dollars per troy oz.	\$2.50
Iridium, dollars per troy oz.	\$430.00
Magnesium sticks, 10,000 lbs.	\$2.02
Mercury, per 76-lb. f.o.b. N.Y.	\$320.00-330.00
Molybdenum, lb. tech. moly oxides, 20 lb. MO can	\$6.85

Nickel electro (PDCR)	\$3.29
Palladium, per troy oz.	\$97.00
Platinum, per troy oz.	\$299.00
Rhodium, per troy oz.	\$1,010.00
Silver ingots, per troy oz.	\$6.125
Vanadium	\$6.00
Zirconium sponge	\$12.00-17.00

(Per lb. unless otherwise noted)

Straits Tin Price

(U.S. cents per lb. EX-SMELTER, based on daily market in Penang in Malaysian dollars per kilo.)

Sept. 16—Holiday	Sept. 19—\$45.50
Sept. 17—\$48.36	Sept. 20—\$51.09
Sept. 18—\$47.81	

Scrap Prices

Brass Mill Scrap

(Cents per lb.; over 20,000 lbs. add 1¢ per lb.)

	Solids	Turnings
Copper	59	48 1/2
Yellow brass	52 1/8	43 1/2
Red brass	55 3/8	45 1/2
Comm. bronze	56 1/2	46
Mang. bronze	45 1/4	44 1/4
Free cutting rod ends	47	46

Custom Smelters Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	54
No. 2 copper wire	45
Light copper	37

Ingot Makers Scrap

(Cents per lb., carload lots, del. refinery)

No. 1 copper wire	50
No. 2 copper wire	41
Light copper	33
No. 1 composition	46
No. 1 comp. turnings	44
Hvy. yellow brass solids	33
Hvy. yellow brass turnings	30
Radiators	35

STEEL PRODUCTION, COMPOSITE PRICES

(Effective September 23, 1985)

U.S. Steel Production

	Last Week	Two Weeks Ago	To Date 1985	To Date 1984
Net tons, in thousands	1,594	1,582	64,001	69,819
Capability Utilization Rate	62.5	62.1	66.1	71.3

Composite Prices

	This Week	Week Ago	Month Ago	Year Ago
Finished Steel Base* (\$/lb.—eff. 7/1/84)	27.582	27.582	27.582	27.582
Pig Iron** (Net ton = 2000 lbs.)	\$213.00	\$213.00	\$213.00	\$213.00
Scrap No. 1 hvy.*** (Gross ton = 2240 lbs.)	\$72.17	\$72.50	\$74.17	\$85.17
No. 2 bundles	\$53.17	\$53.17	\$53.83	\$51.50

Scrap Comparison (Gross Ton)

No. 1 steel, Pittsburgh	\$75.50	\$75.50	\$77.50	\$92.50
No. 1 steel, Philadelphia	68.50	69.50	72.50	81.50
No. 1 steel, Chicago	72.50	72.50	72.50	81.50
No. 1 bundles, Detroit	69.50	69.50	71.50	77.50
Low Phos., Youngstown	70.50	70.50	70.50	80.50
No. 1 mach'y cast., Pgh	71.50	71.50	71.50	71.50
No. 1 mach'y cast., Phila	92.50	92.50	93.50	98.50
No. 1 mach'y cast., Chi	99.50	99.50	99.50	115.50

*Finished Steel Composite: Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite: Based on average prices for basic and foundry pig iron at representative producing plants within the U.S.

***Steel Scrap Composite: Average of No. 1 hvy. melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Aluminum

New mixed clips	33	— 34
Old sheet	30	— 31
Old cast	30	— 31
Clean dry borings	31	— 32

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Aluminum

Segregated clippings	24	— 26
Mixed L.C. clips	21	— 22
Old sheets and cast	20	— 21
Borings and turnings	16	— 18
Duraluminum clippings	24	— 25

Copper and Brass

No. 1 copper wire	45	— 46
No. 2 copper wire	37	— 39
Light copper	32	— 33
Radiators	30	— 31
No. 1 composition	39	— 40
No. 1 composition turnings	36	— 37
Cocks and faucets	28	— 29
Clean heavy yellow brass	27	— 28
Brass Pipe	28	— 29
New soft brass clippings	39	— 40

Lead

Heavy soft lead	6	— 8
Whole batteries	1	— 3
Type metal	16	— 17
Electrotype	13	— 15

Nickel

Nickel solids	120	— 130
Nickel rod ends	120	— 130
Nickel sheets, clips	120	— 130
Nickel turnings	35	— 45

Zinc

New zinc clippings	17	— 18
Old diecast zinc	13	— 14

EFFECTIVE SEPT. 23, 1985

(Effective September 23, 1985) Prices obtained in trade based on representative tonnage per gross ton delivered to consumer unless otherwise stated. Prices are the opinions of Iron Age editors and correspondents, based on contacts with dealers, brokers, generators and users in the industry on the effective date listed above.

Ferrous Scrap Prices

Pittsburgh

No. 1 hvy. melting	\$ 75.00 to \$ 76.00
No. 2 hvy. melting	65.00 to 66.00
No. 1 dealer bundles	90.00 to 91.00
No. 1 factory bundles (auto)	90.00 to 91.00
No. 2 bundles	54.00 to 55.00
No. 1 busheling	89.00 to 90.00
Machine shop turnings	7.00 to 8.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	38.00 to 39.00
Low phos. punchings plate	92.00 to 93.00
Heavy turnings	65.00 to 66.00
No. 1 RR hvy. melting	81.00 to 82.00
Rails, 2 ft. and under	96.00 to 97.00
Scrap rails, random lgth	85.00 to 86.00
RR specialties	95.00 to 96.00
No. 1 machinery cast	71.00 to 72.00
Cupola cast	64.00 to 65.00
Heavy breakable cast	30.00 to 31.00
Stainless	
18-8 bundles and solids	565.00 to 575.00
18-8 turnings	465.00 to 475.00

Chicago

No. 1 hvy. melting	\$ 72.00 to \$ 73.00
No. 2 hvy. melting	67.00 to 68.00
No. 1 dealer bundles	88.00 to 89.00
No. 1 factory bundles (auto)	86.00 to 87.00
No. 2 dealer bundles	61.00 to 62.00
No. 1 busheling	84.00 to 85.00
Shredder scrap	84.00 to 85.00
Machine shop turnings	42.00 to 43.00
Mixed borings and turnings	44.00 to 45.00
Shoveling turnings	46.00 to 47.00
Cast iron borings	45.00 to 46.00
Low phos. large crop	96.00 to 97.00
Low phos. punchings plate	
1/4 in. and heavier	112.00 to 113.00
Low phos. 2 ft. and under	107.00 to 108.00
No. 1 RR hvy. melting	76.00 to 77.00
Scrap rails random lgth	82.00 to 83.00
Roller rails	107.00 to 108.00
Rails, 2 ft. and under	105.00 to 106.00
RR couplers and knuckles	92.00 to 93.00
RR car axles	111.00 to 112.00
No. 1 machinery cast	99.00 to 100.00
Cupola cast	87.00 to 88.00
Stove plate	89.00 to 90.00
Steel car wheels	89.00 to 90.00
Stainless	
18-8 bundles and solids	550.00 to 560.00
18-8 turnings	465.00 to 475.00
430 bundles and solids	150.00 to 155.00
430 turnings	120.00 to 125.00

Philadelphia

No. 1 hvy. melting	\$ 67.00 to \$ 70.00
No. 2 hvy. melting	58.00 to 61.00
No. 1 dealer bundles	82.00 to 85.00
No. 2 dealer bundles	42.00 to 45.00
No. 1 busheling	82.00 to 85.00
Shredder scrap	83.00 to 86.00
Machine shop turnings	25.00 to 28.00
Mixed borings and turnings	25.00 to 28.00
Shoveling turnings	40.00 to 43.00
Low phos. 5 ft. and under	78.00 to 81.00
Low phos. 2 ft. punchings	99.00 to 102.00
Electric furnace bundles	89.00 to 92.00
RR specialties	78.00 to 81.00
Rails, 2 ft. and under	102.00 to 105.00
Cupola cast	76.00 to 79.00
Heavy breakable cast	53.00 to 56.00
No. 1 machinery cast	91.00 to 94.00

Detroit

Brokers buying prices per gross ton on cars.	
No. 1 hvy. melting	\$ 54.00 to \$ 55.00
No. 2 hvy. melting	53.00 to 54.00
No. 1 dealer bundles	69.00 to 70.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	68.00 to 69.00
Drop large flashings	44.00 to 45.00
Machine shop turnings	42.00 to 43.00
Mixed borings and turnings	21.00 to 22.00
Shoveling turnings	42.00 to 43.00
Cast iron borings	24.00 to 25.00
Heavy breakable cast	35.00 to 36.00
Mixed cupola cast	50.00 to 51.00
Automobile cast	74.00 to 75.00
Stainless	
18-8 bundles and solids	525.00 to 535.00
18-8 turnings	400.00 to 410.00
430 bundles and solids	115.00 to 125.00

Youngstown

No. 1 hvy. melting	\$ 69.00 to \$ 72.00
No. 2 hvy. melting	58.00 to 61.00
No. 1 dealer bundles	76.00 to 79.00
No. 2 dealer bundles	33.00 to 36.00
Machine shop turnings	24.00 to 29.00
Shoveling turnings	26.00 to 29.00
Low phos. plate	69.00 to 72.00
Electric furnace bundles	73.00 to 76.00
Galvanized bundles	66.00 to 69.00

Cleveland

No. 1 hvy. melting	\$ 58.00 to \$ 61.00
No. 2 hvy. melting	49.00 to 52.00
No. 1 dealer bundles	80.00 to 83.00
No. 1 factory bundles	69.00 to 72.00
No. 2 bundles	30.00 to 33.00
No. 1 busheling	79.00 to 82.00
Machine shop turnings	18.00 to 21.00
Mixed borings and turnings	9.00 to 12.00
Shoveling turnings	26.00 to 29.00
Cast iron borings	18.00 to 21.00
Cut structural & plates,	
2 ft. and under	102.00 to 105.00
Low phos. punchings plate	102.00 to 105.00
Drop large flashings	54.00 to 57.00
Foundry steel, 2 ft. & under	71.00 to 74.00
No. 1 RR hvy. melting	65.00 to 68.00
Rails, 2 ft. and under	92.00 to 95.00
Rails, 18 in. and under	96.00 to 99.00
Steel axle turnings	59.00 to 62.00
Railroad cast	91.00 to 94.00
Cupola cast	90.00 to 93.00
Stove plate	57.00 to 60.00
Stainless	
18-8 bundles	515.00 to 525.00
18-8 turnings	395.00 to 405.00
430 bundles	95.00 to 105.00

Buffalo

Brokers buying prices per gross ton on cars.	
No. 1 hvy. melting	\$ 55.00 to \$ 56.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 busheling	70.00 to 71.00
No. 1 dealer bundles	69.00 to 70.00
No. 2 bundles	33.00 to 34.00
Machine shop turnings	17.00 to 18.00
Mixed boring and turnings	17.00 to 18.00
Shoveling turnings	23.00 to 24.00
Cast iron borings	25.00 to 26.00
Low phos. plate	77.00 to 78.00
Structural and plate,	
2 ft. and under	81.00 to 82.00
Rails, 2 ft. and under	81.00 to 82.00
Scrap rails, random lgth	65.00 to 66.00
No. 1 machinery cast	76.00 to 77.00
No. 1 cupola cast	58.00 to 59.00

St. Louis

No. 1 hvy. melting	\$ 50.00 to \$ 51.00
No. 2 hvy. melting	39.00 to 40.00
Foundry steel, 2 ft.	48.00 to 49.00
No. 1 dealer bundles	50.00 to 51.00
No. 2 bundles	34.00 to 35.00
Machine shop turnings	15.00 to 16.00
Shoveling turnings	21.00 to 22.00
Cast iron borings	30.00 to 31.00
No. 1 RR hvy. melting	53.00 to 54.00
Rails, random length	59.00 to 60.00
Rails, 18 in. and under	72.00 to 73.00
RR specialties	70.00 to 71.00
Cupola cast	71.00 to 72.00
Heavy breakable cast	49.00 to 50.00
Stove plate	89.00 to 90.00
Steel car wheels	81.00 to 82.00
Rolling rails	69.00 to 70.00
Unstripped motor blocks	64.00 to 65.00

Birmingham

No. 1 hvy. melting	\$ 76.00 to \$ 77.00
No. 2 hvy. melting	72.00 to 73.00
No. 1 dealer bundles	76.00 to 77.00
No. 2 bundles	51.00 to 52.00
No. 1 busheling	76.00 to 77.00
Shredder scrap	93.00 to 94.00
Machine shop turnings	27.00 to 28.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	39.00 to 40.00
Electric furnace bundles	68.00 to 69.00
Elec. furnace, 3 ft. & under	72.00 to 73.00
Structural and plate, 2 ft.	93.00 to 94.00
Structural and plate, 4 ft.	88.00 to 89.00
No. 1 RR hvy. melting	88.00 to 89.00
Scrap rails, random lgth	80.00 to 81.00
Rails, 2 ft. and under	94.00 to 95.00
Angles and splice bars	86.00 to 87.00
No. 1 cupola cast	86.00 to 87.00
Unstripped motor blocks	76.00 to 77.00

Cincinnati

Brokers buying prices per gross ton on cars.	
No. 1 hvy. melting	\$ 54.00 to \$ 55.00
No. 2 hvy. melting	53.00 to 54.00
No. 1 dealer bundles	64.00 to 65.00
No. 2 bundles	34.00 to 35.00
Machine shop turnings	7.00 to 8.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	15.00 to 16.00
Low phos. 18 in. and under	79.00 to 80.00
Rails, random length	59.00 to 60.00
Rails, 2 ft. and under	74.00 to 75.00
Heavy breakable cast	24.00 to 25.00
Drop broken cast	71.00 to 72.00

New York

Brokers buying prices per gross ton on cars.	
No. 1 hvy. melting	\$ 44.00 to \$ 45.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 dealer bundles	20.00 to 24.00
Mixed borings and turnings	10.00 to 11.00
Machine shop turnings	4.00 to 6.00
Shoveling turnings	10.00 to 12.00
Clean cast, chem. borings	35.00 to 36.00
No. 1 machinery cast	79.00 to 80.00
Mixed yard cast	50.00 to 51.00
Heavy breakable cast	10.00 to 12.00
Stainless	
18-8 prepared solids	500.00 to 510.00
18-8 turnings	400.00 to 410.00
430 prepared solids	90.00 to 100.00
410 solids	75.00 to 85.00

Boston

Brokers buying prices per gross ton on cars.	
No. 1 hvy. melting	\$ 51.00 to \$ 53.00
No. 2 hvy. melting	41.00 to 43.00
No. 1 dealer bundles	53.00 to 55.00
No. 2 bundles	34.00 to 36.00
No. 1 busheling	59.00 to 61.00
Shredder scrap	61.00 to 63.00
Machine shop turnings	12.00 to 14.00
Shoveling turnings	18.00 to 20.00
No. 1 machinery cast	75.00 to 80.00
Mixed cupola cast	46.00 to 48.00
Heavy breakable cast	8.00 to 10.00

San Francisco

No. 1 hvy. melting	\$ 38.00 to \$ 40.00
No. 2 hvy. melting	32.00 to 34.00
No. 1 dealer bundles	29.00 to 31.00
No. 2 dealer bundles	17.00 to 19.00
Machine shop turnings	8.00 to 9.00
Cast iron borings	8.00 to 9.00
No. 1 cupola cast	80.00 to 82.00

Los Angeles

No. 1 hvy. melting	\$ 38.00 to \$ 40.00
No. 2 hvy. melting	32.00 to 34.00
No. 1 dealer bundles	29.00 to 31.00
No. 2 dealer bundles	16.00 to 18.00
Machine shop turnings	13.00 to 14.00
Shoveling turnings	10.00 to 11.00
Cast iron borings	8.00 to 9.00
Elec. furnace, 1 ft. and under	
(foundry)	70.00 to 72.00
No. 1 cupola cast	72.00 to 74.00

Seattle

No. 1 hvy. melting	60.00 to 62.00
No. 2 hvy. melting	51.00 to 53.00
No. 2 bundles	35.00 to 37.00
No. 1 cupola cast	89.00 to 90.00
Mixed yard cast	80.00 to 82.00

Hamilton, Ont.

Brokers buying prices per gross ton on cars.	
No. 1 hvy. melting	\$ 82.00
No. 2 hvy. melting, cut 2 ft. and under	72.00
No. 1 dealer bundles	83.00
No. 2 bundles	58.00
Mixed steel scrap	53.00
Bush. new fact. prep'd	83.00
Bush. new fact. unprep'd	64.00
Machine shop turnings	35.00
Short steel turnings	35.00
Mixed borings and turnings	20.00
Cast scrap	89.00

Houston

Brokers buying prices per gross ton on cars.	
No. 1 hvy. melting	\$ 70.00 to \$ 71.00
No. 2 hvy. melting	57.00 to 58.00
No. 2 bundles	43.00 to 44.00
Machine shop turnings	13.00 to 14.00
Crushed turnings	33.00 to 34.00
Shredder scrap	77.00 to 78.00
Cut structural plate, 2 ft. and under	100.00 to 101.00
Cut structural plate, 5 ft. and under	82.00 to 83.00
Unstripped motor blocks	60.00 to 61.00
Cupola cast	86.00 to 87.00

Disinflation turned to deflation in August for prices of producer finished goods. The price decline from July came to 0.3 pct.

An actual decline in these prices is not new. In June, finished goods tags also declined, then by 0.2 pct.

What is new is that producer prices for the year may break, or at least equal, record lows reaching back two decades.

Through the first eight months this year, producer finished goods prices were up 0.8 pct. Some economic forecasters are saying that prices for all of 1985 may equal or beat the 0.5 pct increase of 1964.

One source forecasts an actual decline in prices for the full year. The last year of an actual decline was 1963, when prices fell by 0.2 pct.

While the recent price softness has been surprising, it is the turnaround in prices that is mind-boggling. After all, forecasters now are talking about possible 20-year records for low prices and it is just a few short years from the 1979-81 years when producer prices averaged 11.3 pct rises per year.

It has not been metalworking industrial goods lines that have led in the present price softness. The average August rise for the 22 key metalworking product lines listed on the table here came to 0.9 pct.

Metalworking capital goods lines, however, are running below the overall rise rate. Prices of these lines rose by only 0.2 pct in August.

One notable point seen on the table is that 11 of the 22 product lines in August showed no price changes or actual declines. Recent price pressures have been steadily pushing metalworking products into no-change or minus readings.

By year's end, will the month-to-month price changes for the products listed here be all minus readings? Stay tuned.

Products	Index Reading For Month (1967 = 100)	Pct Change From Previous Month	Pct Change From Year-Ago Month
Metal Cutting Machine Tools	397.0	— 0.1	+ 3.1
Metal Forming Machine Tools	434.8	0	+ 2.4
Agricultural Machinery & Equip.	338.4	— 0.2	— 0.1
Construction Machinery & Equip.	362.5	+ 0.1	+ 1.6
Industrial Process Furnace & Ovens	385.4	+ 0.1	+ 2.6
Industrial Material Handling Equip.	295.8	+ 0.1	+ 1.9
Pumps, Compressors & Allied Equip.	357.0	+ 0.2	+ 2.4
Fluid Power Equip. (Dec. 1970 = 100)	265.1	— 0.1	+ 1.3
Mechanical Power Transmission Equip.	340.1	0	+ 3.7
Automobiles	227.9	— 0.4	+ 3.5
Motor Trucks—Light	293.7	+ 0.1	+ 4.4
Motor Trucks—Heavy	333.3	0	+ 0.7
Railroad Equipment	364.6	+ 0.5	+ 1.9
Fabricated Metal Structural Products	315.1	+ 0.2	+ 0.9
Electric Motors	351.2	— 0.2	+ 3.2
Valves & Fittings (Dec. 1982 = 100)	104.9	0	+ 2.2
Ball & Roller Bearings	354.2	+ 0.2	+ 2.8
Cutting Tools & Accessories	268.8	+ 0.3	+ 2.7
Heating Equipment	261.1	+ 0.2	+ 2.2
Plumbing Fixtures & Brass Fittings	313.5	+ 0.1	+ 2.9
Metal Containers	357.9	— 0.1	+ 1.7
Miscellaneous Metal Products	303.1	0	+ 2.7

Data based on U.S. Labor Dept.'s Producer Price Index